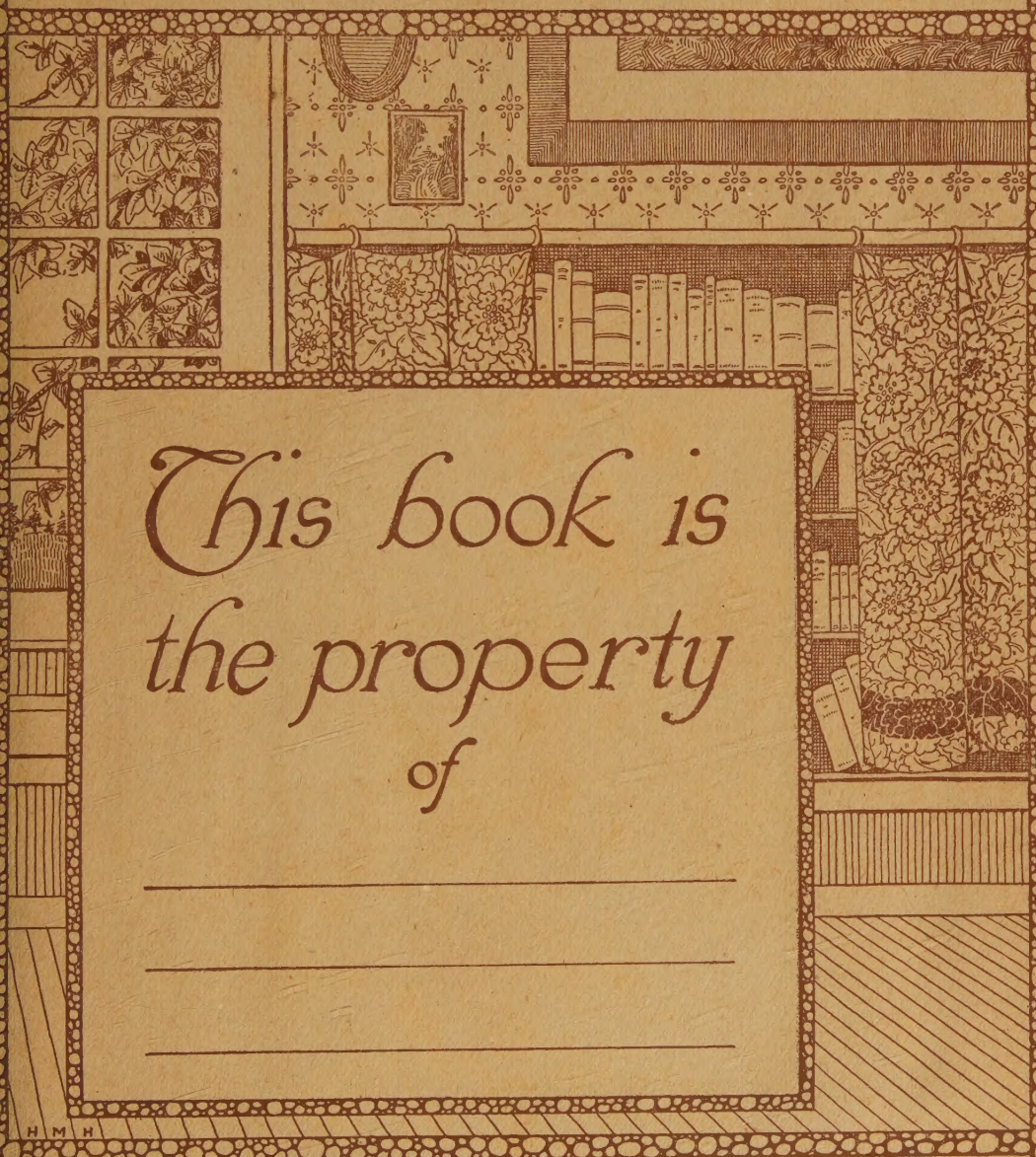
THE AMERICAN EDUCATOR

PRACTICAL HELP IN HOME AND SCHOOL

AMERICAN

Education commences at the mother's knee, and every word spoken within the hearing of little children tends towards the formation of character. —*Ballou*

EDUCATOR



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Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it.

—Samuel Johnson

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PEACE EDITION

IN EIGHT VOLUMES

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BOTANY BAY, a bay in New South Wales twenty miles in extent, so called on account of the great number of new plants collected in its vicinity. It was entered by Captain Cook in 1770, when he took possession of New South Wales in the name of the British sovereign.

BOT'FLY, the common name of a class of flies that are very troublesome to stockmen. They are heavy-bodied, hairy insects, somewhat resembling bumblebees. The botfly which preys on horses and cows lays its eggs upon the hairs of the animal's flanks or legs, and the larvae, when hatched, are licked up by the tongue and taken into the mouth, stomach and intestines, causing much injury and suffering. The larvae of other species burrow inside the nostrils of stock, and there are some which live under the skin of the animals. Cattle which have lumps on their backs show the presence of botfly larvae. Kerosene injected into the spots will destroy the grubs.

BOTHNIA, *bahth' ni a*, GULF OF, a gulf forming the northern arm of the Baltic Sea, lying north of the Aland Islands and projecting between Finland on the east and Sweden on the west. Its length is 400 miles, its average width about 120 miles and its depth from 164 to 330 feet. There are numerous islands, and many small inlets along the shores, so navigation is rather difficult, although there are many good harbors. On account of the large number of mountain streams flowing into it, the waters are comparatively fresh. In winter the gulf freezes over. In 1918 the Aland Islands were captured by the Germans, and the German fleet dominated the gulf.

BOTH'WELL, JAMES HEPBURN, Earl of (1536?–1578), known in Scottish history by his marriage to Mary Queen of Scots. It is believed that he was deeply concerned in the murder of Darnley, Mary's husband. He was charged with the crime and was tried, but, appearing with 4,000 followers, he was readily acquitted. He was then in high favor with the queen, and, with or without her consent, he seized her at Edinburgh, carried her a prisoner to Dunbar Castle and prevailed upon her to marry him after he had divorced his own wife. A confederacy was formed against him, and in a short time Mary was a prisoner in Edinburgh. Meanwhile Bothwell had been forced to flee to Denmark, where he died.

BOTTICELLI, *bot te chel'le*, SANDRO (properly ALESSANDRO FILIPEPI) (1447–1515), an Italian painter of the Florentine school. Working at first in the shop of the goldsmith Botticelli, from whom he takes his name, he showed such talent that he was removed to the studio of the distinguished painter, Fra Filippo Lippi. To the fire and passion of his master's style, he added a fine imaginativeness and delicacy of his own. His greatest works are his madonnas, which exhibit particularly his individuality and religious fervor (see MADONNA). There is a certain tender and pathetic expression in the faces of all his figures. Some of his other works are *The Triumph of Spring, Birth of Venus, The Nativity* and *The Adoration of the Magi.* There are many of his pictures in the galleries in Europe, and in the Pitti, Florence, and several frescoes are in the Sistine Chapel, Rome. In his later years Botticelli became an ardent disciple of Savonarola, and is said to have neglected painting for the study of mystical theology.

BOTTLE, a vessel for holding liquids. At one end is a narrow neck with a small opening, which can be closed with a stopper. Bottles are now chiefly made of glass or earthenware. In bottle-making the glass is blown instead of pressed into form. A mass of molten glass is taken from the smelting furnace and placed on the end of a hollow metal tube. The operator blows into the tube, and the glass is formed into a long, hollow, pear-shaped mass, which is then swung into an open mold. The mold is closed upon it, and the glass forced into every detail of the pattern by the lungs of the blower. The extra glass above the mold is broken off, the bottle is removed, and the mouth is shaped up by softening in the oven and working with a special tool. It is then sent through the tempering oven. The molds are kept very cool by a blast of air from a large air tube overhead.

It is important that the proper amount of glass be gathered for a bottle; otherwise the bottles are too thick or too thin. The lettering on bottles is done by a plate en-

graved reverse and placed in the mold. In some large factories bottles are made by machines constructed for the purpose. The melted glass passes from the furnace into the machine, which does the work formerly done by workmen. See GLASS.

BOTTLE-TREE, the name applied to a tree which has a trunk resembling a bottle with bulging sides. There are several species. The Australian bottle-tree is the most common, having a short, bottlelike trunk and dense foliage. The natives make nets of the fibers and use the sap in the stem as a drink.

BOUCICAULT, *boo'se ko*, DION (1822–1890), an Irish dramatic author and actor. He studied to become an architect, but the success of a comedy, the well-known *London Assurance*, which he wrote when only nineteen years old, started him on a career in connection with the stage. In 1852 he became an actor, and in 1853 he went to America, where he was scarcely less popular than in England. On his return in 1860 he produced a new "sensational" style of drama, of which *The Colleen Bawn* and *Arrah-na-Pogue* are the best examples. In collaboration with Joseph Jefferson he dramatized Irving's story of *Rip Van Winkle*, in which Jefferson became world-famous as an actor. As an actor Boucicault was clever, but not highly gifted. He wrote about 300 dramatic pieces.

BOUGHTON, *bou'ton*, GEORGE HENRY (1834–1905), an English-American artist who is widely known as a painter of colonial and Dutch life. He was taken to America from England when five years of age, and his first art studies were pursued in the United States. Later he had the advantages of European study and travel. Boughton's canvases have a realism that gives them great charm. He is best remembered as the painter of *Return of the Mayflower, Puritans Going to Church, The Scarlet Letter* and a number of admirable Dutch scenes.

BOUILLON, *boo yoN'*, GODFREY DE. See GODFREY DE BOUILLON.

BOULANGER, *boo lahN zha'*, GEORGES ERNEST JEAN MARIE (1837–1891), a French soldier who figured in a conspiracy to restore the monarchy. He served in Algeria, Italy and China, fought in the Franco-German War, and became brigadier-general in 1880. He was made minister of war in 1886, and in this capacity he was active in procuring the expulsion of the Orleans princes from the army and from France. He successfully contested several seats in the Chamber of Deputies, and in 1889 was elected deputy for Paris by a very large vote. Two months later the government, claiming to have evidence of his intended treason, began a prosecution, and Boulanger fled to Brussels and thence to the Isle of Jersey. He was convicted in his absence and remained an exile. It was eventually shown that he was a tool in the hands of certain plotting Royalists. He committed suicide in Brussels in 1891.

BOULDER, *bole'dur*. In geology the word is applied to ice-worn and partially smoothed blocks of large size, lying on the surface of the soil, or embedded in clays and gravels. They generally differ in composition from the rocks in their vicinity, a fact which proves that they must have been transported from a distance, probably by ice. When lying on the surface, boulders are known as *erratic blocks*. The *boulder clay*, in which these blocks are found, belongs to the post-Tertiary or Quarternary Period. It occurs in many localities, consists of a compact clay often separated by thin beds of gravel and sand, and is believed to have been deposited from icebergs and glaciers in the last glacial period. See ERRATICS; GLACIERS; GLACIAL PERIOD.

BOULDER, COLO., founded in 1858, is the county seat of Boulder County, on the Union Pacific, the Colorado & Southern and the Denver, Boulder & Western railroads, twenty-nine miles northwest of Denver, at the base of the Rocky Mountains. The city has mills for tungsten ore reduction, ore sampling works, a cutlery factory and brick and cement works. A state armory was constructed in 1917. The state university is located here, and there is a business college, Saint Gertrude's Academy and a Carnegie Library. Boulder is the location of the Colorado Chautauqua. Population, 1910, 9,539; in 1917, 12,012 (Federal estimate).

BOULOGNE, *boo lo'ny'*, FRANCE, a seaport situated at the mouth of the Liane River and on the English Channel, twenty-two miles southwest of Calais and 139 miles northwest of Paris. It is called "Boulogne on the Sea" to distinguish it from a city of like name on the Seine. The city is divided into an upper and a lower town, the upper town being surrounded with spacious boulevards constructed on the ancient ramparts. The lower town is

the business section and is modern in its plan and structure. The important buildings are the castle, erected in 1231, the church of Notre Dame, the Hotel de Ville and the palace of justice. The city also contains public baths, a public library and a museum of natural history. The trade and the fisheries are very extensive.

Boulogne is one of the most important seaports of France and has daily steamer communication with England. The lower town has quite a large English population, and the English language is quite generally spoken. It is one of the oldest cities of France and still shows evidence of Roman occupation. It was captured by the Northmen in 882, and in 1544 it was taken by Henry VIII of England. It was destroyed by Charles V in 1553. It was here that Bonaparte gathered a large army for the purpose of invading England, but he never carried out his purpose. Louis Napoleon attempted to start an insurrection here in 1840, but he failed and was imprisoned in the castle. During the World War the city was one of the Channel ports which were threatened by the German invaders. Population, 1911, 53,128.

BOUN'TY, in political economy, a reward or premium granted for the encouragement of a particular kind of employment or production, the idea being that the development of such trade or production will be of benefit to the whole community. The term is especially applied to the amount given for the destruction of noxious plants or animals. The same name is given to a premium offered by government to induce men to enlist in the public service, especially to the sum of money formerly given to recruits in the army and navy. In Canada an annual appropriation is made by the government to encourage the fishing industry; the money is distributed as a bounty to men engaged in the fisheries. Bounties are also paid in Canada to stimulate the production of crude petroleum and of iron, steel and lead.

BOURBON, *boor'bon*, an ancient French family which has given three dynasties to Europe, the Bourbons of France, of Spain and of Naples. The first of the line known in history is Adhemar, who, at the beginning of the tenth century, was lord of the old province Bourbonnais. The power and possessions of the family increased steadily until, in 1272, Beatrix, daughter of Agnes of Bourbon and John of Burgundy, married Robert, sixth son of Louis IX of France, and thus connected the Bourbons with the royal line of the Capets. Their son Louis had the barony converted into a dukedom and became the first duke of Bourbon.

Two branches took their origin from the two sons of this Louis. The elder line was that of the Dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault of the city of Rome. The younger was that of the counts of La Marche, afterward Counts and Dukes of Vendôme. From these descended Anthony of Bourbon, Duke of Vendôme, who by marriage acquired the kingdom of Navarre, and whose son, Henry of Navarre, became Henry IV of France. Anthony's younger brother, Louis, Prince of Condé was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons—the royal and that of Condé.

The royal branch was divided by the two sons of Louis XIII, the elder of whom, Louis XIV, continued the chief branch, while Philip, the younger son, founded the House of Orleans. The kings of the *elder French royal line* of the House of Bourbon run as follows: Henry IV, Louis XIII, XIV, XV, XVI, XVII (who never obtained the crown), XVIII and Charles X. The last sovereigns of this line, Louis XVI, Louis XVIII and Charles X, were brothers, all of them being grandsons of Louis XV. Louis XVIII had no children, but Charles X had two sons, and it was the younger of these, who was the father of the count of Chambord, who was looked upon by his party as the legitimate heir to the crown of France.

The branch of the Bourbons known as the House of Orleans was raised to the throne of France by the Revolution of 1830, and was deprived of it by that of 1848. A regular succession of princes leads to the notorious Egalité Orleans, who in 1793 died on the scaffold, and whose son, Louis Philippe, was king of France from 1830 to the Revolution of 1848. It is a representative of this branch, Louis Philippe, Count of Paris, who is the present head of the family, uniting in himself the claims of both branches to the throne of France.

The Spanish Bourbon dynasty originated when, in 1700, Louis XIV placed his grandson Philip, Duke of Anjou, on the Spanish throne, as Philip V. From him is descended Alfonso XIII of Spain.

The royal line of Naples, or the Two Sicilies, took its rise when, in 1735, the younger son of Philip V of Spain obtained the crown of Sicily and Naples and reigned as Charles III. In 1759, however, he succeeded his brother Ferdinand VI on the Spanish throne, and at that time he transferred the Two Sicilies to his third son, on the condition that this crown should not be united with that of Spain. Ferdinand IV had to leave Naples in 1806; but after the fall of Napoleon he again became king of both Sicilies under the title of Ferdinand I, and the succession remained to his descendants until 1860, when Naples was incorporated into the new kingdom of Italy.

BOURGEOISIE, *boor zhwah zee'*, a name applied to a certain class in France, in contradistinction to the nobility and clergy, as well as to the working classes. It thus corresponds nearly with the English term, "middle classes." The term is now applied quite generally to the middle classes of other countries, and was used frequently in connection with the revolution which overthrew the Russian government headed by Kerensky (1917). The Bolsheviki, who gained control of affairs, made war on all members of the bourgeoisie, that is, on all classes between the nobility and peasantry, as well as on the upper classes. See BOLSHEVIKI.

BOURGET, *boor zha'*, PAUL (1852–), a French essayist and novelist who ranks with the foremost contemporary French writers. He was graduated at the Collège de Sainte-Barbe in Paris and then took up journalism. His first publication, with the exception of contributions to magazines, was a volume of verse called *Restless Life*. His *Studies and Portraits* and *Essays on Contemporary Psychology* show him to be a brilliant psychological analyst, and the same trait is manifested strongly in his novels. Among the latter are *The Disciple, Cruel Enigma* and *The Promised Land*. Bourget is at all times a realist, and he shows a profound knowledge of human nature.

BOURINOT, *boo're no*, SIR JOHN GEORGE, (1837–1902), a Canadian historian and parliamentarian. After his graduation from Trinity College, Toronto, he established the *Halifax Reporter*, of which he was the editor for many years. His first historical and political papers, many of which were later expanded into books, appeared in the proceedings of the Royal Society of Canada. He was the recognized authority on questions of parliamentary procedure and constitutional history. Among his best-known books are *Parliamentary Procedure and Practice, Manual of Constitutional History, Parliamentary Government in Canada, How Canada is Governed, Canada under British Rule* and *Canada's Intellectual Strength and Weakness*.

BOW, *bo*, one of the most ancient and widely-used weapons of offense. It is made of steel, wood, horn or other elastic substance. The curving bow is the typical form of this weapon, but the ancient Grecian bow was somewhat in the form of the letter Σ. In drawing it, the hand was brought back to the right breast, and not to the ear. The Scythian bow was nearly semicircular. The long-bow was the national weapon in England. The battles of Crécy (1346), Poitiers (1356) and Agincourt (1415) were won by this weapon, which was made of yew or ash. It was of the height of the archer, or about six feet long, the arrow usually half the length of the bow. Since the introduction of firearms the bow has gradually ceased to be used except for recreation. See ARCHERY.

BOWDOIN *bo'd'n*, **COLLEGE**, the oldest institution of learning in Maine, chartered in 1794 and named after James Bowdoin, governor of Massachusetts, of which state Maine was then a district. Connected with Bowdoin College is the medical school of Maine, organized in 1820. The college is noted for the many eminent men who have graduated from it. Among others were Henry W. Longfellow, Franklin Pierce, Chief Justice Melville W. Fuller, Thomas B. Reed and Robert E. Peary. The college has about thirty instructors, over 430 students and a library containing nearly 110,000 volumes and buildings valued at about $1,000,000.

James Bowdoin (1727–1790), for whom the college was named, was active in the patriot cause before and during the Revolution. In 1774 he was elected a member of the Continental Congress, in 1775 became president of the Massachusetts council and in 1779 presided over the state constitutional convention. In 1785 Bowdoin became governor of the state and proved his executive ability by his energetic measures in the suppression of Shays' Rebellion. He was later a member of the convention that framed the Federal Constitution. Bowdoin was one of the founders, and became the president, of the American Academy of Arts and

Sciences, and he was also a founder of the Massachusetts Humane Society.

BOWELL, Sir Mackenzie, (1823–1917), a Canadian statesman, born at Rickinghall, Suffolk, England, and educated at the Belleville (Ontario) public schools. At the age of eleven he entered the office of the Belleville *Intelligencer,* of which he later became editor and proprietor. He was elected to the House of Commons as a Conservative in 1867 and served continuously till he was called to the Senate in 1893. In 1878 he entered the cabinet of Sir John Macdonald as minister of customs; he was minister of militia under Sir John Abbott, and later, as minister of trade and commerce, he was instrumental in securing the Pacific Cable to Australia. In December, 1894, he became Premier, but resigned in April, 1896. Until 1906 he was leader of the opposition in the Senate. Sir Mackenzie took an early interest in the militia and in 1857 assisted in raising a rifle company. He was in active service on the frontier during the American Civil War and in the Fenian troubles in 1866, retiring with the rank of Colonel.

BOW'ER-BIRD, a name given to several different birds living in Australia or the Pacific islands. They are so called because in the nesting season they build remarkable bowers to serve as places of resort. These are constructed on the ground, usually under

BOWER-BIRD

overhanging branches in secluded parts of the forest. Here the male birds meet and dance and go through the queer antics that are supposed to attract their mates. One species uses only small shells for decoration; another bird builds a tentlike structure around a sapling, using for rafters the stems of an orchid that continues to blossom after it is picked; still another uses only feathers. This fondness for bright things is not confined to the bower-birds, though no other birds seem to possess it to so great a degree. The magpie may be mentioned as an American illustration of this trait.

BOWERY, The, a street in New York City, formerly the resort of a lawless class who made the name "Bowery" a synonym for "tough." The Bowery has become a respectable though not a genteel thoroughfare. It is lined with cheap stores of every description, and one sees there people representing a wide variety of races, the Jews being particularly prominent. The street runs parallel with Broadway and extends from Chatham Square to Cooper Union, where Third and Fourth avenues join. Originally the name spelled *Bouwerie,* the name of the estates of Governor Peter Stuyvesant.

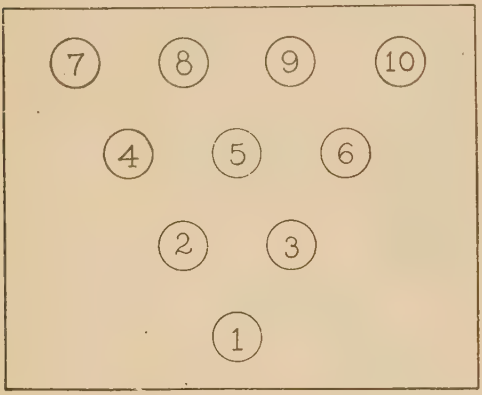
BOWLING, a modern development of an old English game, played indoors, and especially popular during the cool months of the year. The game is played on a long, level and very smooth "alley" made of boards stood on edge. The alley is forty-two inches wide, with a narrow gutter on each side to receive balls inaccurately rolled, and sixty feet long. There is a runway for players at one end and a depression at the other end, to receive spent balls and pins which are knocked down. One attendant is necessary on each alley, to reset the pins and return the balls on a slanting roadway to the players.

Besides the alley there are ten wooden pins, fifteen inches high, with bases two and one-fourth inches in diameter. Each pin weighs three pounds two ounces. The pins are set at the lower end of the alley, twelve inches apart, as shown on page 534.

The balls are of various weights, and must be perfectly round. They are made of wood, preferably of lignum-vitae, or of a durable composition. The regulation ball weighs six-

teen pounds; for young players and for many women balls averaging eight to twelve pounds are popular. Each ball has either two or three thumb and finger holes, with which to manipulate it.

The object of the game is to knock down the pins by rolling the ball along the alley. Each player may roll two balls and must then give way to an opponent. Each of these innings is called a *frame.* If a player knocks down all the pins with a single ball, it is known as a *strike;* if he knocks them all down with the two balls, it is known as a *spare.* The count is reckoned on the number of pins knocked down in ten innings or frames. The side having knocked down the most pins, wins. The method of scoring, however, is too technical to describe at length, but it enables the player to count more than



RELATIVE POSITION OF PINS

once some of the pins he has knocked down. Three hundred is the highest possible score.

Bowling was derived from the ancient English game of bowls, played on a level grassy plot. The playing ground was 120 feet long. The players rolled balls along the grassed alley and attempted to place them as near as possible to a large wooden pin at the farther end. With modifications this game is still very popular. It will be remembered that in the fanciful story of *Rip Van Winkle* Rip came upon bowlers in a level space in the mountains. They were engaged in this ancient pastime.

BOWLING GREEN, Ky., the county seat of Warren County, is 114 miles southwest of Louisville. It is on the Barren River, and on the Louisville & Nashville railroad. It is in a rich agricultural region and has a trade in hay, corn, wheat, oats, tobacco, mules and hogs. Alfalfa production in the vicinity is increasing. The city has the largest made-to-order dress factory in the world. Bowling Green is the seat of Ogden College, Saint Columbia's Academy, the Western Kentucky State Normal School and a business college. Vast quantities of building stone are found in the vicinity. Population in 1910, 9,173; in 1917, 9,900 (Federal estimate).

BOX-EL'DER, the ash-leaved maple, a small but beautiful tree of the United States. The tree grows rapidly almost anywhere, and accordingly it is a favorite shade tree. The wood is soft and brittle, but is used in making bowls, pails and wood pulp, and as a fuel.

BOXER REBELLION, an outbreak in China in 1901 against foreigners. After the Chino-Japanese War of 1894–1895 the European powers secured for themselves so many commercial and territorial concessions that a large number of Chinese began to fear that the nation would lose its independence. Feeling against the foreigners grew steadily, and by 1900 much was heard of the Boxer organization, a body of volunteer Chinese soldiers. *Boxer* was an incorrect translation of the Chinese name of the organization, which really meant *Fist of Righteous Harmony.*

Matters came to a climax in June, 1901, when Pekin was in the hands of a mob, and the foreign diplomats and a few missionaries and their families were besieged in the British legation. An allied army of 18,000 was finally organized, and on August 14 Pekin was entered. Two weeks later the allies—Japanese, Russians, British, Americans, French and Germans—marched into the Forbidden City and the rebellion collapsed.

China was severely punished. Besides agreeing to crush the anti-foreign movement, the government agreed to pay an indemnity of $330,000,000 to the allies. During President Roosevelt's administration the United States remitted half of its share of the indemnity, and asked that the money be used to pay the expenses of a number of Chinese students in American colleges. During the World War China entered the conflict on the side of the allies on condition that the payment of the indemnity still due should be postponed.

BOXING, an art which consists in dealing blows with the fists against an opponent, and in protecting the body, with hands and

arms, against the opponent's blows. It is classed among athletic contests, but rightfully so only when indulged in by amateurs who use soft gloves. When hard gloves are used and a contest continues until one contender is unable to rise from the floor the so-called sport is known as prize-fighting.

Gloves thickly padded over the back of the hand, the fingers and the thumb, so as to give the appearance of a very thick mitt, are used in boxing. The leather is soft and pliable, and the gloves used by amateurs are so soft that injury is rarely inflicted by the blows. A boxing match usually consists of a specified number of rounds, each lasting three minutes, with an intermission of one minute between rounds. If at any time (except during the last ten seconds of a round) a boxer is knocked down, he is allowed ten seconds in which to get on his feet unassisted. If he fails, he is "counted out" and loses the match. The competitions take place in a *ring*, which is an oblong about 16 by 24 feet, surrounded by two ropes, which make a fence 4 feet high. The regulation athletic costume is used in boxing matches. Boxers are classified according to their weights, the numbers given here being the maximum limit: Bantam weight, 105 pounds; feather weight, 115 pounds; light weight, 135 pounds and under; welter weight, 145 pounds; middle weight, 158 pounds; heavy weight, over 158 pounds.

Boxing with soft gloves and in the friendliest spirit, is endorsed by directors of athletics as a healthful and useful recreation. It teaches alertness and agility, and the art of self-defense. Rules governing the sport may be obtained wherever athletic goods are sold.

Professional heavy-weight boxing, or prize-fighting, is referred to in the article Prize-Fighting.

BOXING THE COMPASS, in seaman's phrase, is the ability to repeat the names of all the points of the compass in their proper order—an accomplishment required of all sailors. That the compass on a ship is kept in a box may be the explanation of the origin of the term.

BOX TORTOISE, *tor'tis*, or **BOX TURTLE**, a name given to those North American tortoises or turtles that can completely shut themselves into their shell, which can be closed by hinged joints in the lower shell. They are land animals, and feed chiefly on berries and mushrooms. It is the shell of a species of sea tortoise that furnishes the valuable tortoise shell.

BOX TREE, a shrubby evergreen tree twelve or fifteen feet high, with small oval and opposite leaves, and greenish, inconspicuous flowers, male and female on the same tree. It is a native of England, Southern Europe and parts of Asia, and was formerly so common in England as to have given its name to several places—Boxhill, in Surrey, for instance, and Boxley, in Kent. The wood is of a yellowish color, close-grained, very hard and heavy, and takes a beautiful polish. Therefore it is much used by turners, wood carvers, engravers on wood and mathematical instrument makers. Flutes and other wind instruments are made from it. The boxwood of commerce comes mostly from the regions adjoining the Black and Caspian seas, and is said to be diminishing in quantity. In gardens and shrubberies box trees may often be seen clipped into various formal shapes. There is also a dwarf variety reared as a hedge for garden walks.

BOYCOTTING, the name given to an organized system of injuring a person's business by ignoring him. It was first employed in connection with the Land League and agitation of 1880 and 1881 in Ireland, and took its name from Captain James Boycott, a Mayo landlord, against whom it was first put in force. Persons who are subjected to boycotting find it difficult or impossible to get any one to work for them, to supply them with the necessaries of life or to associate with them in any way. Union labor has at times used the boycott to secure higher wages and other demands, but this form of coercion is expressly forbidden by law in most states of the Union.

BOYLE'S LAW, sometimes called MARIOTTE'S LAW, is a law in physics, to the effect that the volume of a gas at a constant temperature will vary inversely as the pressure to which it is subjected. A given volume of gas under a pressure of two pounds to the square inch will occupy twice the space it will under a pressure of four pounds to the square inch.

BOYNE, BATTLE OF THE, a battle in which the army of William III of England defeated the forces of James II. It was fought in 1690, and decided once for all the question of England's supremacy in Ireland. The

Boyne is a small river in Eastern Ireland, about thirty miles north of Dublin.

BOYS' AND GIRLS' CLUBS, organizations for the educational development of the nation's youthful citizens. Both in Europe and America clubs for young people of school age are being formed in increasing numbers, and in the latter country the work has been definitely organized under the direction of the Department of Agriculture.

How the Movement Began. As far back as the last decade of the nineteenth century a few progressive county school superintendents in the agricultural states of the Middle West began to interest themselves in club work for boys and girls, and later the state agricultual colleges extended aid to the movement. As no funds were appropriated for systematic development of club activities, it was not until the United States Department of Agriculture took hold of the work, in 1908, that satisfactory progress was made. Since that time every state in the Union has been organized, and there are annual appropriations to support the work and to pay trained organizers and directors.

The Scope and Purpose of Club Work. The work accomplished by the boys' and girls' clubs is of a practical nature. The young people learn by doing, and they have definite results to show for their labor. They engage in gardening, poultry and hog raising and canning and preserving, and the girls take up, in addition, sewing, cooking and home management. The work is all carefully systematized and accurate records are kept of whatever is attempted. The club members engaged in any enterprise know just how much has been expended, and exactly what the profits are at the end of the season. Field meetings, demonstrations, exhibitions at fairs, contests, etc., are important features of club work in every community.

The objects of this work are to give young people in agricultural communities proper instruction in farm work and home economics, to give them training in leadership, to encourage initiative and develop executive ability, to advance the social life of the community and strengthen the idea of coöperation between individuals and families, and to inculcate habits of thrift, economy and industry. It is believed that by means of club activities the importance of agriculture in the life of the nation is emphasized, and that the interest taken by young people in farm and home economics will be a source of strength to the country for years to come.

Figures and Results. Nearly 210,000 boys and girls were organized into clubs within less than ten years after the United States Agricultural Department took up the movement. In a single year over $509,000 was cleared by those who took up profit-making projects. In twenty-eight states in that year 1,670 canning demonstrations were conducted and were attended by 156,580 persons. The printed bulletins sent out each year are numbered in millions.

In some states an agent in charge of club work is stationed at the state agricultural college, from whom directions for organizing clubs may be secured. If there is no state agent, the States Relation Service of the Department of Agriculture, at Washington, D. C., will send all necessary information upon request.

BOY SCOUTS, a patriotic organization for boys, non-military in character, though a uniform is prescribed and obedience to orders is a cardinal principle. Boys between the ages of twelve and eighteen are eligible to membership.

The American organization owes its existence either to Daniel Carter Beard or to Ernest Thompson Seton; the honor is claimed by each. In 1905 Beard organized among boys the Sons of Daniel Boone, which he called "a society of tenderfeet and boy scouts." At about the same time Seton organized the Woodcraft Indians, to spread knowledge of Indian customs and characteristics among boys. In 1910 the latter organization voted to unite with Beard's Sons of Daniel Boone, under a new name, the Boy Scouts of America. Such an organization already existed in England, under the leadership of Sir Robert Baden-Powell.

The purposes and methods of the Boy Scouts are summed up in the term *scout-craft*. Scout-craft consists of first aid, life saving, tracking, signaling, cycling, nature study, seamanship and other instruction. This is accomplished in games and team play, and is pleasure, not work, for the boy.

Before he becomes a scout a boy must take the scout's oath, thus: "On my honor I promise that I will do my best; (1) To do my duty to God and my country; (2) To help other people at all times; (3) To obey the Scout Law." Eight boys constitute a patrol, which chooses one of its members as the patrol leader. Three patrols form a troop, which has an adult Scout Master. There are now about 250,000 Boy Scouts in the United States alone. The movement spread quickly to Canada, where the Governor-General is Chief Scout, to France, Germany, Italy, Australia, New Zealand and several South American republics. The honorary president of the Boy Scouts of America is the President of the United States; William H. Taft and Daniel Carter Beard are honorary vice-presidents. The real head of the organization is Colin H. Livingstone; James E. West is the active executive. Headquarters is at 200 Fifth Avenue, New York City. Any boy may send to that address for Scout literature.

After the United States entered the World War, the Boy Scouts rendered valuable service to their country in a variety of ways. They were especially active in the sale of Liberty Bonds and Thrift Stamps and as ushers at patriotic meetings.

BOZEMAN, *boz'man*, MONT., founded in 1864 and named for its first settler, is the county seat of Gallatin County, ninety-six miles southeast of Helena, on the Northern Pacific and the Chicago, Milwaukee & Saint Paul railroads. The State College of Agriculture and Mechanic Arts is here, and there is a Carnegie Library. There are extensive flour mills, and in the region are large deposits of coal, building stone and onyx. The state fish hatchery is three miles distant. The inhabitants are nearly all American. Population, 1910, 5,107; in 1918, 6,210 (Federal estimate).

BOZZARIS, *bo'tsah ris*, MARCO (1788–1823), a Greek hero of the War of Independence, who distinguished himself by his patriotism and military skill. He was killed in a night attack upon the camp of the Pasha of Scutari. The incident gave rise to the poem *Marco Bozzaris* by Fitz-Greene Halleck. In this poem these lines occur:

Bozzaris! with the storied brave
Greece nurtured in her glory's time,
Rest thee; there is no prouder grave,
Even in her own proud clime.
* * * *
For thou art freedom's now, and fame's,—
One of the few, the immortal names
That were not born to die.

BRABANT, *brah'bant*, the central district of the lowlands of Holland and Belgium, extending from the Waal to the sources of the Dyle, and from the Meuse and the plain of Limburg to the lower Scheldt. This territory now comprises the Dutch province of North Brabant, and the southern part of the Belgian provinces of Brabant and Antwerp. In the time of Caesar, Brabant was inhabited by a mixed race of Germans and Celts, but in the fifth century the Franks took possession of it. Later it became a part of the Duchy of Lorraine. The principality of Brabant grew up around the city of Louvain. In 1430 Brabant came under the rule of the House of Burgundy and later passed to the Hapsburgs. The northern part of Brabant took part in a revolt of the Netherlands against Philip II of Spain and became a part of the Dutch Republic. After the wars of Napoleon all of Brabant was included in the kingdom of the Netherlands and was divided into three provinces, but the present Belgian portion became a part of Belgium in 1830. Duke of Brabant is the title of the eldest son of the Belgian king. See BELGIUM; WORLD WAR.

BRADDOCK, EDWARD (1698–1755), a British soldier, remembered chiefly as the leader of the Fort Duquesne expedition, in which George Washington also took part. In 1754, at the outbreak of the French and Indian War, Braddock was made commander of all British troops in America. He arrived at Hampton, Va., in 1755, and near Alexandria met the Virginia troops for the expedition against the French Fort Duquesne. By April 24 he had reached Frederick, Md., when he was forced to wait for wagons to transport his stores. He was joined there by Washington, whom he invited to be his aid-de-camp, and Benjamin Franklin, then postmaster-general of the colonies. He scorned the advice of Franklin regarding the danger from the ambuscades of the Indians, and set out from Fort Cumberland by the path marked out by Washington two years earlier. The army consisted of about 1,200 regulars and provincials and a few friendly Indians.

On July 9 the advance division under Gates was attacked by a band of French and Indians. Frightened by the warwhoop which

they heard for the first time, the British fell back in confusion, and Braddock tried to rally them against their invisible foes. Familiar with Indian warfare, the Virginians separated, and sought shelter behind rocks and trees, but Braddock, dispensing with the "military instruction of a Virginia colonel," Washington, kept his men drawn up in platoons, and they fired at random into the forest, killing many of the Americans. Braddock's personal bravery was conspicuous. Five horses were killed under him, and he was at last mortally wounded. The battle ended in a rout, and less than half of the force survived and was led to safety by Washington. See FRENCH AND INDIAN WARS.

BRADDOCK, PA., founded in 1795 on the site of General Braddock's defeat in 1755, is a manufacturing city in Allegheny County, ten miles east of Pittsburgh. It is on the Pennsylvania, the Baltimore & Ohio and Lake Erie railroads, and on the Monongahela River. The industries center largely in steel, wire, pig iron, cement and plaster. The city has the finest Carnegie Library on the American continent. Population, 1910, 19,367; in 1917, 22,060 (Federal estimate).

BRADFORD, ENGLAND, an industrial city in Yorkshire, situated on a tributary of the Aire, eight miles west of Leeds. Bradford is in a vicinity of rich coal and iron mines, and is a prosperous center of woolen and cotton manufacture. In the worsted mills alone 36,000 persons find employment in peace times. The city has good streets and modern buildings, and is thoroughly up to date in matters of government. It has a number of public parks and is noted for its excellent public utilities, including the water, gas and electric light works, which are owned by the municipality. The most important structures are the town hall, Saint George's Hall, Mechanics' Hall, the exchange and the temperance hall. The city contains a technical college, a free public library and numerous other educational institutions. There are also an infirmary, an eye and ear hospital, an institution for the blind and several almshouses. Population, 1911, 288,458.

BRADFORD, PA., founded in 1823, is a city in McKean County, seventy-eight miles south of Buffalo, N. Y., on a tributary of the Allegheny River, and on the Pennsylvania, the Erie, the Buffalo, Rochester & Pittsburgh and several other railroads. It lies in a productive oil field and in a natural-gas region, and has oil refineries, gasoline manufactories, tool shops, boiler and gas engine works, extensive lumber interests and wood-working establishments. The commission form of government was adopted in 1914. Fourteen miles away is the great Kinzua bridge, 300 feet high and 2,100 feet long. Population in 1910, 14,544; in 1917, practically unchanged.

BRADFORD, WILLIAM (about 1590–1657), a colonial statesman in America, second governor of Plymouth colony and the chief historian of that colony and period. He was born in Yorkshire, England, and joined the Separatist Church at Scrooby, but was imprisoned when that congregation went to Holland in 1608. Later he joined his friends at Leyden and became a prominent member of the community there. He went to America on the *Mayflower*, and upon the death of Carver he became governor of the colony, holding the office continuously until his death, with the exception of a period of five years. During all this time he was the responsible head of the colony and administered its affairs with remarkable foresight and sagacity.

Bradford's *History of Plymouth Plantation*, which is the foundation for all later accounts of the period, was left by the author in manuscript form. During the Revolution it disappeared, but in 1855 it was discovered in England in the library of Fulham. On being returned to America this valuable work was published; the original manuscript is now preserved in the Massachusetts archives.

BRADLEY, JOSEPH PHILO (1813–1892), an American jurist, one of the most distinguished constitutional lawyers of his time. He was born at Berne, N. Y., educated at Rutgers College, and admitted to the bar in 1839. Bradley attained prominence in his profession and was a Republican elector in the Fremont campaign of 1856. In 1870 he was appointed Associate Justice of the Supreme Court, and in 1876 he was a member of the electoral commission which decided the Presidential election in favor of Hayes. See ELECTORAL COMMISSION.

BRADSTREET, ANNE (1612–1672), an American poet, remembered to-day solely because hers is one of the first names in American literature. She was a daughter

of Thomas Dudley, the second governor of Massachusetts colony, and was married to Governor Simon Bradstreet in 1628. Her poetry consisted chiefly of discourses on the history and phenomena of the universe. Modern readers find little of interest in her poems, but they were exceedingly popular when they first appeared, and Mrs. Bradstreet was given the name of "The Tenth Muse."

BRADY, Cyrus Townsend (1861–1920), an American clergyman and author, who has written many popular stories of the masculine, warlike type. He was born in Allegheny, Pa. After graduating from the United States Naval Academy he resigned from service, worked with two western railroads, and after studying theology, was an Episcopal rector. Later he became archdeacon of Kansas, then of Pennsylvania, and successively rector of churches in Philadelphia, Toledo, Ohio, and Kansas City, Mo. He was a chaplain in the Spanish-American War. Brady's writings include *Recollections of a Missionary in the Great West.* lives of Decatur and Paul Jones, *Under Tops'ls and Tents, On the Old Kearsarge, The Island of Regeneration, The Cliff-Dweller's Pot, Bob Dashaway, The Fetters of Freedom, Briton of the 7th, The Eagle of the Empire, The Island of Surprise, Web of Steel* (1916), *When the Sun Stood Still* (1917), and *Waif-o'-the-Sea* (1918).

BRAGG, Braxton (1817–1876), a noted Confederate general was born in North Carolina. He was graduated at West Point in 1837, was appointed second lieutenant of the third artillery and served against the Seminoles in Florida. For gallant service in the Mexican War he was brevetted captain major and lieutenant-colonel. In 1856 he resigned from the Army and engaged in planting in Lousiana, and at the beginning of the Civil War he was appointed brigadier-general in the Confederate army and placed in command at Pensacola, Fla. In 1862 he became major-general in command of the second division of the Confederate army, and he held a prominent command at the Battle of Shiloh. After the evacuation of Corinth he succeeded General Beauregard in command of the army in the west. He was defeated at Perryville and at Murfreesboro, but was successful at Chickamauga. General Grant defeated him at Chattanooga, and in December of that year Bragg was relieved from command at his own request. He was later called to Richmond to act as military adviser to President Davis, with whom he was a favorite.

BRAHE, *brah*, or *brah'ay*, Tycho (1546–1601), a Danish astronomer, the instructor of Kepler and one of the greatest scientists of his time. With Brahe began the period of accuracy in astronomical calculations, and undoubtedly Kepler's achievements were due in large part to Brahe's teachings. He was born at Knutstorp. From early life he manifested an interest in the study of the heavens, and though destined by his uncle for the law he devoted most of his time to astronomical observations. In 1572 he discovered a new star in the constellation Cassiopeia. Later he was offered by Frederick II of Denmark an island on which to establish an observatory, besides the necessary funds for its erection and equipment and ample salary for its care. He accepted the proposition and erected the observatory, where for over twenty years he continued his observations, testing and improving old theories and bringing to light many new ones. After the death of Frederick II Brahe was so persecuted that he left the country, but he continued his astronomical work elsewhere until his death.

BRAH'MA, a Sanskrit word signifying (in its neuter form) the Universal Power, or the ground of all existence, not an individual deity, but only an object of contemplation, a universal spirit of which the human soul is a part. It is also (in its masculine form, with long final syllable) the name of the first person in the Triad (Brahma, Vishnu and Siva) of the Hindus. The personal Brahma is presented as a red or golden-colored figure, with four heads and as many arms, often accompanied by the swan or goose. He is the god of the Fates, master of life and death, yet he is himself created, being merely the agent of Brahma, the Universal Power. Brahma is not worshiped by the common people, and there is only one temple sacred to him.

BRAH'MANISM, a religious and social system prevalent among the Hindus, and so called because developed and expounded by the priestly caste known as the Brahmans. It is founded on the ancient religious writings known as the Vedas, which are regarded as sacred revelations. The Brahmans as a body

became custodians and interpreters of these writings, and the priests and general directors of sacrifices and religious rites. As the priestly caste increased in numbers and power, they made the ceremonies more elaborate and added to the Vedas other writings. In time the caste of Brahmans came to be accepted as a divine institution, and an elaborate system of rules was made which defined and enforced its place by the severest penalties, as well as that of the inferior castes, the Kshatriyas, or warriors, the Vaisyas, or cultivators, and the Sudras, or slaves. It was not without a struggle that the warriors recognized the superiority of the Brahmans. It was by the Brahmans that the Sanskrit literature was developed; and they were not only the priests, theologians and philosophers, but also the poets, men of science, lawgivers, administrators and statesmen of the Aryans of India.

The sanctity and inviolability of a Brahman are maintained by severe penalties. Murdering or robbing one of the order are sins for which there is no atonement; even the killing of his cow can only be expiated by a painful penance. A Brahman should pass through four states: first, as Brahmachari, or novice, he begins the study of the sacred Vedas, and is initiated into the privileges and the duties of his caste. He has a right to alms, to exemption from taxes and from capital and even corporal punishment. He is not allowed to eat flesh and eggs and must not touch leather, skins of animals and most animals themselves. When manhood comes he ought to marry, and, as Grihastha, enter the second state, which requires more numerous and minute observances. When he has begotten a son and trained him up for the holy calling, when he sees the son of his son, he ought to enter the third state, and as Vanaprastha, or inhabitant of the forest, retire from the world for solitary praying and meditation, with severe penances to purify the spirit; but this and the fourth or last state of a Sannyasi, requiring a cruel degree of asceticism, are now seldom reached, and the whole scheme is to be regarded as representing rather the Brahmanical ideal of life than the actual facts.

The oldest Vedic literature represents a worship of natural objects; the sky, personified in the god Indra; the dawn, in Ushas; the various attributes of the sun, in Vishnu, Surya and Agni. These gods were asked for assistance in the common affairs of life and were pleased by offerings which, at first few and simple, afterward became more complicated and included animal sacrifices. In the later Vedic hymns a philosophical idea of religion and of the problems of being and creation appears struggling into existence; and this tendency is systematically developed by the supplements and commentaries known as the Brahmans and the Upanishads. In some of the Upanishads the deities of the old Vedic creed are treated as symbolical. Brahma, the supreme soul, is the only reality, the world is regarded as coming from him, and the highest good of the soul is to become united with the divine. The necessity for the purification of the soul for its reunion with the divine nature gave rise to the doctrine of transmigration of souls.

From this philosophical development of Brahmanism came a distinct separation between the educated and vulgar creeds. While from the fifth to the first century B. C. the higher thinkers among the Brahmans were developing a philosophy which recognized that there was but one god, the popular creed had concentrated its ideas of worship round three great deities—Brahma, Vishnu and Siva, who now took the place of the confused old Vedic Pantheon. Brahma, the creator, though considered the most exalted of the three, was too abstract an idea to become a popular god, and soon sank almost out of notice. Thus the Brahmans became divided in allegiance between Vishnu, the preserver, and Siva, the destroyer and reproducer, and the worshipers of these two deities now form the two great religious sects of India. Siva, in his philosophical significance, is the deity mostly worshiped by the real Brahman, while in his aspect of the destroyer, or in one of his female manifestations, he is the god of the low castes and is often worshiped with degrading rites. But the highly cultivated Brahman is still a pure theist, and the educated Hindu in general professes to regard the special deity he chooses for worship as merely a form under which the One First Cause may be approached.

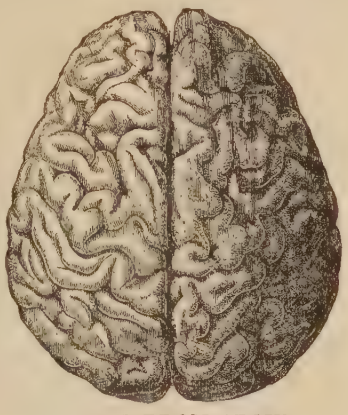
BRAHMAPUTRA, *brah ma poot'ra*, a large river of Asia, rising in Tibet, flowing southward through the Himalayan Mountains and then westward into India, where it unites with the Ganges about ninety miles above its mouth. The sources of the Brahmaputra are not well known, but they are

in mountain regions over 16,000 feet above the sea. In the first part of its course the stream is called the Sanpo, and after it passes through the mountains it is known as the Dihong. It is then joined by the Dibong and Lohit, after which the united streams are known as the Brahmaputra. Its entire length is about 1,800 miles, and it is navigable for 800 miles from the sea. It flows through a fertile valley planted to rice, tea and jute, and is remarkable in that it has no bridges. Travelers cross it in boats or on rafts.

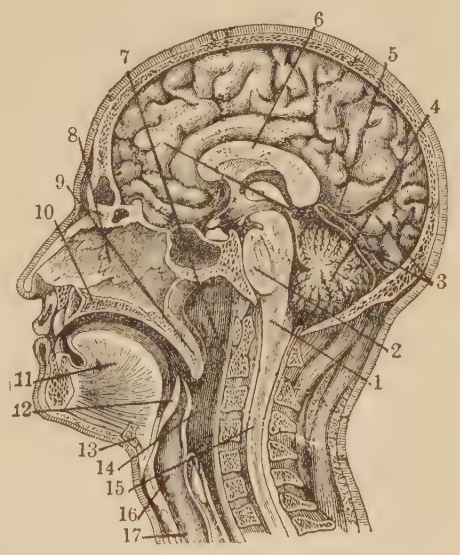
BRAHMS, JOHANNES (1833–1897), a German musical composer whose compositions are noted for their high intellectual quality. Brahms' music is generally conceded to be difficult to understand, and the composer has never appealed to the popular taste. He ranks, however, with the greatest masters of all time. The father of Brahms, who played the double bass in a Hamburg orchestra, gave his son a good musical education, and by the time the lad was twenty he was acclaimed a genius by Schumann, who had heard him play a number of original compositions. His work includes symphonies, serenades, concertos, songs and other compositions, but his masterpiece is the majestic *German Requiem*. The latter part of his life was spent in Vienna, after he had appeared in most of the music centers of Germany.

BRAIN, the center of the nervous system in man and the higher animals. The human brain is the seat of the mind and the source of all that mankind has achieved. No great invention was ever perfected, no great picture was ever painted, no great book was ever written, that was not first produced in the brain of a human being. "Out of it are the issues of life." The quality of a man's brain determines in large measure what his life shall be. Scientists have studied this wonderful organ, and have named its parts and identified the materials of which it is made. Beyond this they cannot go. How the brain mechanism creates man's thoughts, intellect, soul—call it what you may—is an unsolvable mystery.

Though there are exceptions to the rule, the quality of the brain generally varies directly in proportion to the weight. The human brain is larger and heavier, not only in proportion to the weight of the body, but in actual mass, than that of any other animal except the elephant and some species of whales. The brain of the average adult male weighs about three pounds, and that of the average woman is a little less, because her body is smaller. Idiots and the lower races of mankind, such as savages, have brains proportionately lighter; an idiot's brain weighing only eight and one-half ounces has been noted. On the other hand, the brain of Cuvier, the great French naturalist, weighed sixty-four ounces.



BRAIN, FROM ABOVE

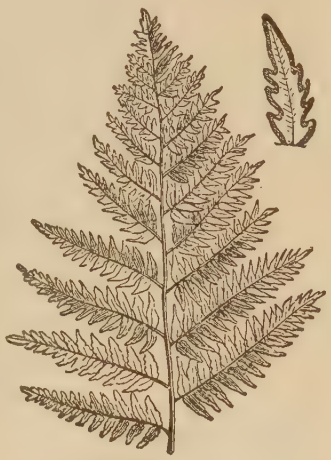


SECTION THROUGH HEAD AND NECK

1, medulla oblongata; 2, pons; 3, right lobe of cerebrum; 4, cerebellum in section; 5, blood vessel; 6, corpus striatum; 7, nasal passage; 8, nasal bone; 9, soft palate; 10, hard palate; 11, tongue; 12, epiglottis; 13, os hyoides; 14, esophagus; 15, spinal cord; 16, larynx; 17, windpipe.

The human brain is composed of the *cerebrum, cerebellum, pons variolii* and *medulla oblongata*. These and other important parts are shown in the cut. This organ is covered

with a delicate membrane, the *pia mater,* which carries the blood vessels that supply the brain with blood. Lining the skull is a tough membrane, the *dura mater,* which extends downward into the fissure that separates the hemispheres of the cerebrum and forms a partition between the cerebrum and cerebellum The *arachnoid membrane* lies between the other two; it receives its name from its delicate structure, likened to a cobweb. The substance of the brain is gray and white tissue. The gray tissue forms an outside layer of the cerebrum and cerebellum, which in this respect differ from the medulla oblongata and the *spinal cord,* and it forms a covering for the white substance into which it dips in the convolutions that increase its surface. It varies in thickness from one-twelfth to one-eighth of an inch.



BRAKE

Related Articles. Consult the following titles for additional information:

Cerebellum	Nervous System
Cerebrum	Psychology
Medulla Oblongata	Spinal Cord

BRAKE, a device for stopping or retarding the motion of a vehicle by pressure against the wheels. The shoe brake is a typical form of this device, and one generally used on vehicles drawn by horses. It consists of a wood or metal block which presses against the rim of the wheel by means of a system of levers. Hand brakes on railway cars are set by winding a chain attached to the lever around an axle turned by a wheel in the hands of the brakeman. These are now little used.

Automobiles are equipped with flexible band brakes placed around the rim of the wheel and so adjusted that they can be tightened by pressure on a lever which the driver works with his foot. For the mechanism used in stopping railway trains, see AIR BRAKE.

BRAKE, or **BRACKEN,** a species of fern very common in America and Europe generally, and often covering large areas on hillsides and on untilled grounds. It has a black creeping rootstalk, from which fronds grow often to the height of several feet and divide into three branches. As the plants remain erect in winter, they form a good cover for game throughout the year. The rootstock is bitter, but it has been eaten in times of famine, and used in brewing as a substitute for hops.

BRAMANTE, *bra mahn'ta,* DONATO (1444–1514), a great Italian architect, the founder of the Middle Renaissance school of architecture. Bramante began his career in Milan, where his greatest work was the choir and dome of Santa Maria delle Grazie. At the age of fifty-five he went to Rome, where a study of the great Roman monuments changed his style completely, and he became the leader of a new school. He was patronized by the Popes, and his greatest work was done as the first architect of the Church of Saint Peter. Owing to his death, his plans were never carried out, but they exercised a great influence on the work of later architects.

BRAM'BLE, the name commonly applied to a bush with trailing prickly stems, which is called in Scotland, brambles, and in England, blackberry. It is rarely cultivated, but as a wild plant it grows in great abundance. The flowers do not appear till late in the summer, and the fruit, which is deep purple or almost black in color, does not ripen till autumn.

BRAN, the outer coat of cereal grains, obtained as a by-product in the process of milling (see FLOUR). Usually a qualifying word is used to show the kind of bran meant, as corn bran, rye bran, etc., but when wheat bran is referred to it is customary to use only the term *bran.* Wheat-bran preparations for mixing with flour find a ready market because bran has laxative effects. Mixed with cornmeal it is an admirable stock food, especially for dairy cows.

BRANDEIS, *bran'dise,* LOUIS DEMBLITZ (1856–), an American jurist, known especially as the advocate of liberal ideas in the political and economic life of the country. When appointed Associate Justice of the United States Supreme Court by President Wilson in 1916, he was opposed in the Senate by a powerful group of members who distrusted his radical tendencies, and it was

five months before his confirmation by the Senate was secured.

Justice Brandeis was born in Louisville, Ky. After his graduation from the Harvard Law School in 1877 he began the practice of law in Boston, where he lost both clients and friends because of his vigorous opposition to certain "special interests." He figured also in railroad investigations, in movements for safeguarding the health of women and children workers, as an advocate of industrial arbitration and in similar lines of activity. Many of his criticisms of railroad management were found to be justified by subsequent developments, especially after the government took over the roads in 1918.

BRANDENBURG, *brahn'den boorK,* the most populous province of Prussia, the leading state of the former German Empire. Berlin, the largest city of Germany, is in Brandenburg, which occupies a central position in Prussia and is 15,376 square miles in area. In 1910 it had a population of 4,092,616, an average of about 266 persons to the square mile. The surface of the province is flat, and the country is well watered by over 600 lakes and numerous rivers, including the Oder and the Elbe. There are numerous canals. The principal crops are barley, rye, potatoes, tobacco, hemp, flax and hops. The most important manufactures are wool, silk, linen, paper and leather. The chief cities, besides Berlin, are Potsdam, Konigsberg and Frankfort-on-the-Oder.

From 1415, when Frederick of Hohenzollern was invested with the title of elector of Brandenburg, until the end of the World War, in 1918, the province was under the rule of the Hohenzollern dynasty. Elector Frederick III incorporated Brandenburg into the kingdom of Prussia in 1701 and took the title of King Frederick I of Prussia. See PRUSSIA; GERMANY.

BRANDES, *brahn'des,* GEORG MORRIS COHEN (1842–), a Danish critic, one of the foremost literary men of his time. He was born in Copenhagen. Brandes was the first man to infuse into Danish thought and literature the ideals and tendencies of modern European literature, and he has had a quickening influence on thought outside of Denmark. Among the most important of his earlier works was the series of lectures delivered at the University of Copenhagen and afterward published as the *Main Literary Currents of the Nineteenth Century.* Later works include *Danish Poets, Eminent Authors of the Nineteenth Century, Men and Works in European Literature* and *Recollections of My Childhood and My Youth.*

BRANDON, MAN., on the Assiniboine River, is the center of an agricultural district containing nearly 300 small towns and hamlets. It is 133 miles west of Winnipeg, on the Canadian Pacific, the Canadian Northern and the Great Northern railroads. The city has ten banks, twenty wholesale houses and a motorized fire department. It is the seat of Brandon College. The manufacturers are extensive and varied. Population, 1911, 13,839; in 1917, 16,215 (estimated).

BRANDY, the liquor obtained by the distillation of wine, or the refuse of the winepress. It is naturally colorless, but derives a pale amber color if placed in wooden casks. Sometimes it is darkened by means of coloring matter. The best brandy is made in France, particularly in the Cognac district in the department of Charente.

Much of the so-called brandy sold in England and America is made from more or less coarse whisky, flavored and colored to resemble the real article; and France also exports quantities of this sort of brandy. In America various distilled liquors get the name of brandy, as apple brandy or peach brandy, being named from the fruit from which they are made. Brandy is often used in medicine as a stimulant.

BRANDYWINE, BATTLE OF THE, a battle of the Revolutionary War, important because the outcome made it possible for the British to enter Philadelphia. It was fought on Brandywine Creek, near Wilworth, N. J., September 11, 1777. The American force of 11,000 was commanded by General Washington; 18,000 British soldiers were under General Howe. The British took the offensive, and by a brilliant flank movement on the part of Cornwallis, forced the Americans to retreat. The losses were about equal.

BRANGWYN, *brang'win,* FRANK (1867–), an English painter, illustrator and etcher, regarded as one of the most versatile artists of his day. He was born in Bruges, Belgium, where his father was established as a manufacturer of ecclesiastical embroideries and garments. Brangwyn studied in England in the South Kensington art school and in the studio of William Morris. Though his paintings show his indebtedness to Morris in respect to their decorative quality, his

deepest and most lasting impressions were acquired through extensive travels in the East. In his paintings he emphasizes color, and in his etchings he brings out contrasts of light and shade, at all times suppressing those details which keep a work of art from being universal in character. He has achieved magnificent results in such mural paintings as *Modern Commerce,* in the Royal Exchange, London, and a series for the Pan-American Exposition at San Francisco. *London Bridge* and *The Paper Mill* are representative etchings. In 1904 Brangwyn was elected a member of the Royal Academy.

BRANT, JOSEPH (Thayendanega) (about 1742–1807), a Mohawk Indian chief. At the age of thirteen he accompanied his two elder brothers, who took part in Sir William Johnson's campaign against the French at Lake George. He was sent to the Rev. Eleazar Wheelock's Indian school at Lebanon, Conn., became interpreter to a missionary and was frequently employed by Johnson as an agent among various tribes.

During the Revolution the Mohawks adhered to the British, and Brant received a commission in the British army, in which he attained the rank of colonel. He participated in the Battle of Oriskany, one of the bloodiest engagements of the war, and led the Indians in many raids on the border settlements of New York, but he was not present at the massacre of Wyoming. After the war he removed to an estate in Canada granted by the British government, and at Brantford, Ont., there is a statue in honor of him.

BRANTFORD, ONT., the county town of Brant County, situated on the Grand River and on the Grand Trunk Railroad, seventy miles east of London. The city contains the Ontario institution for the education of the blind. The leading industries are the manufacture of agricultural implements, foundry products, engines and boilers, wagons, brick and rubber goods. There are eighty factories. The river is navigable, and a canal connects the town with Lake Erie. Electric lines connect with other cities. Brantford was named from the Mohawk chief Brant, and a fine monument was erected to his memory in Victoria Square. The town is the headquarters for the Amalgamated Tribes of the Six Nations. Population, 1911, 23,132.

BRASS, one of the most important alloys, is produced by combining copper and zinc. As most generally seen it is bright yellow in color and is not unlike gold in appearance, a fact which is responsible for its use as a metal for cheap jewelry. Brass buttons for uniforms, brass gas fixtures, brass beds and brass door knobs are a few of the many familiar objects made of this alloy, and it is also employed extensively in the manufacture of wire screening. Brass is harder than either of the metals of which it is made, and it resists the action of air better than copper. A coating of lacquer or varnish, however, is necessary to keep it from tarnishing. The metal can be cast in molds, drawn into fine wire or rolled into sheets. Different varieties are obtained by varying the amounts of zinc and copper. Ordinary yellow brass contains two parts of copper to one of zinc, but doubling the proportion of copper produces a reddish brass.

In the process of manufacture it is customary to heat thin pieces of copper, charcoal and carbonate of zinc in crucibles, and then to cast the molten metal into bars or ingots or to pour it into molds, according to the purpose in view. Brass ingots are passed through heavy rollers in the manufacture of sheet brass; the complicated processes involved in the manufacture of brass wire are described in the article WIRE.

BRA'ZEN SERPENT. In very ancient times the serpent was elevated to the dignity of a god of healing. Assyrians and Babylonians made serpents of metal and placed them as guards at the doors of their places of worship. Moses caused a brazen serpent to be elevated above his sorely-tried people; any person looking upon it would be healed (see *Numbers* XXI, 9). Several hundred years later incense was burned to brazen serpents by the Hebrews.

BRAZIL, *bra zil',* IND., founded in 1844, is the county seat of Clay County, sixteen miles northeast of Terre Haute and fifty-seven miles southwest of Indianapolis. It is on the Chicago & Eastern Illinois, the Vandalia and the Central Indiana railroads. The industries center largely in the manufacture of clay products, particularly brick, sewer pipe, conduits, flue linings and silo blocks. The Clay companies employ about 1,000 men. A Federal building, erected in 1913, cost $74,000; a court house, built in the same year, cost $275,000. There is a Carnegie Library. Population, 1910, 9,340; in 1917, 10,472 (Federal estimate).

A rubber gatherer's home

BRAZIL, THE UNITED STATES OF, a South American republic of federated states, the largest and richest country of the continent. With an area of about 3,280,900 square miles, Brazil covers nearly half of the continent, and within its boundaries may be found over forty per cent of the inhabitants of South America. Brazil is the only South American country in which Portuguese is the official language. It contains the world's greatest river system—the Amazon—and it is the source of four-fifths of the world's coffee supply. It also leads all other countries in the production of cacao, from which we derive chocolate and cocoa, and it is one of the few lands from which crude rubber is obtained. This interesting country touches the border of every South American nation except Ecuador and Chile; the rest of its boundary line is formed by the Atlantic Ocean, which encloses it on the northeast, east and southeast.

People and Cities. Various estimates have been given for the population of the Brazilian republic, but the tendency is to give higher figures than are warranted. An estimate of 24,000,000 for 1917 may be regarded as fairly accurate. Less than half of the inhabitants are of the pure white race, and about one-third are half-breeds. The remainder are negroes and Indians, many of whom live under very primitive conditions. The whites are chiefly of Portuguese descent, but their numbers have been materially increased by European immigrants. To encourage the country's development the Brazilian government offered special inducements to colonizers, with the result that large numbers of Germans, Italians and Russians were attracted to the country. The Germans became especially numerous and active in the southern states, and at the outbreak of the World War they were said to number 500,000.

The chief cities are Rio de Janeiro, the capital, São Paulo, Bahia, Pernambuco, Para and Manaos.

Education and Religion. While education is free, it is not compulsory, and for many years the illiteracy rate has been high, especially in the interior districts. In 1911 a decree was issued for the reform of the school system, and a Board of Education with full control over all schools was provided for. The large cities possess libraries, museums and professional schools. The government maintains schools for the blind, deaf and dumb at Rio de Janeiro, and a school of arts and a national institute of music in the same city. At Rio de Janeiro, São Paulo and Porto Alegre there are engineering schools, and a mining school is maintained at Ouro Preto. In addition there are colleges of law, pharmacy, medicine and other professional institutions in various parts of the republic. No complete university has as yet been established. The government maintains twenty-nine colleges for the education of teachers, and there are fifteen private schools of a similar nature. What is most needed is an efficient system of general education for the masses.

The great majority of the people are Roman Catholics, but there is no State Church, and all religious bodies enjoy freedom of worship.

Surface and Drainage. The outstanding physical features of Brazil are the plateau region known as the Brazilian highlands, and the great Amazon basin. The plateau region occupies the southern and eastern part of the country, and geologically is the most ancient section of the continent. Traversed by mountain ranges of very irregular distribution, and broken by numerous river valleys, it presents a striking picture of the effects of erosion. Three mountain systems may be distinguished, the chief of which is the Serra do Mar, forming the northeastern edge of the plateau. A narrow strip of land separates it from the ocean, and the name means *Sea Mountains*. The highest summit in Brazil, Mount Itatiaya, with an altitude of 8,900 feet, is a prominent feature of this range. A second range, the Serra Central, joins the Serra do Mar not far from Rio de Janeiro, and extends northward, while a third range branches off to the northwest, separating the sources of the São Francisco and Tocantins rivers from those of the Parana. West of the Brazilian Highlands there is another highland region extending to the Andes and forming the divide between the tributaries of the Amazon and those of the

Rio de la Plata. Brazil is also separated from the Guianas and Venezuela by mountain ranges.

The Amazon basin is a region of marvels, and there are large areas in its tropical forests that no white man has ever explored. In 1914 Theodore Roosevelt nearly lost his life while exploring a section of the wild country, and it was on this expedition that he discovered a new tributary of the Madeira, nearly 1,000 miles long. Skeptical critics called it the "River of Doubt," but later investigations proved its authenticity, and the Brazilian government named it officially the Rio Téodoro.

The Amazon basin lying to the north and west of the Brazilian tableland, and covering over half the total area of the country, is a vast plain less than 500 feet above sea level. The total length of the Amazon and its branches within Brazil—the Negro, Madeira, Tocantins and other rivers—is about 19,000 miles; an aggregate of 13,000 miles is open to navigation. This magnificent system drains about two-thirds of the country. Other important streams are the Paraguay and Parana, whose combined drainage basin covers about one-fourth of Brazil. The chief river of the eastern plateau is the São Francisco, navigation on which is interrupted sixty miles from the mouth by falls.

Climate. With the exception of the two most southerly states, Brazil lies wholly within the tropical regions; yet, owing to the modifying influences of altitude and winds, the temperature seldom exceeds 95° and is remarkably even in most portions of the country throughout the year. Most of the country receives a very heavy rainfall; those portions of the Amazon basin near the coast have an annual rainfall of from seventy-five to 100 inches, but farther inland the fall increases in certain localities to from 300 to 400 inches. The plateau on the east also receives an abundance of moisture, but the states immediately south of the Amazon near its mouth receive less rainfall than other portions of the country and occasionally suffer from prolonged droughts, as do certain portions of the interior. Most of the rain falls between January and June, while from June to October the weather is comparatively clear and dry.

Products of the Soil. Though the vast agricultural riches of Brazil have been hardly more than tapped, the country is a great storehouse of many important products. The states of São Paulo, Rio de Janeiro, Espirito Santo and Minas Geraes are the principal coffee sections, São Paulo alone furnishing half of the world's supply. Brazil's average yearly crop is estimated at about 12,000,000 sacks (132 lb. to the sack). Rubber ranks next in importance, the annual crop averaging about 38,000 tons. Because of the scarcity of labor the rubber industry has never reached full development. Cacao growing is an important industry of the state of Bahia. Sugar is produced at the rate of 300,000 tons a year, chiefly in the northeast; other products include cotton, tobacco, fruit, Brazil nuts, corn and rice.

Manufacturing. Cotton weaving has shown rapid development within recent years, and Brazilian factories supply the home demand for all but the finest grades of cloth. At Rio de Janeiro and other manufacturing centers there are manufactories of woolen goods, flannels, rugs, felts, etc., and silk manufacture is being encouraged. The country imports large quantities of wheat flour from Argentina and Uruguay, but flour milling is carried on to a considerable extent in Rio de Janeiro. The making of malt liquors is also important.

Minerals and Mining. Brazil has valuable mineral resources, but mining is in rather a backward state. Coal, diamonds, gold, manganese ores and petroleum are found in workable quantities, and Brazil furnishes the greater part of the world's supply of monazite. Small quantities of mica, talc, copper ore, platinum, rock crystal and agate are also found.

Transportation. A railway system is being constructed which will eventually bring the railroads of Uruguay, Argentina and Paraguay into connection with those of Brazil. Over 16,000 miles of railway are now open to traffic in the country, of which about 3,000 are owned and operated by the government. In the remote forest regions of the Amazon basin the only transportation lines are the rivers.

Government. Brazil is a federal republic comprising twenty states, one national territory and one Federal district. The government is based on a constitution which very closely resembles that of the United States. The executive power is vested in a President, Vice-President and seven ministers. The latter are at the head, respectively, of the

departments of Finance; Justice, Interior and Public Instruction; War; Marine; Foreign Affairs; Communications and Public Works; Agriculture, Industry and Commerce. The legislative department consists of a Senate and Chamber of Deputies. The Senate consists of three members from each state, and three from the Federal district, elected by the people for nine years, the terms of one-third of the Senators expiring every three years. The Chamber of Deputies consists of Deputies elected by popular vote for three years, and apportioned to the states according to population.

Each state has its own governor and legislature and is in many respects more independent than are the states of the American Union, since the states of Brazil have the privilege of treating with foreign powers concerning commercial affairs, and any state may divide its territory into other states or two or more states may consolidate. Each state is divided into municipalities and districts for the purpose of local government.

History. Brazil was first seen by Vicente Pinzon in 1500. Between 1532 and 1535 the country extending from 30° south to the equator was divided into twelve districts whose boundaries extended westward without limit. These districts were granted to independent captains for colonization, but the plan failed and the claims reverted to the Portuguese crown. The early settlers enslaved the natives and in 1549, when Jesuit missionaries began to work among the Indians, the settlers entered a protest against this practice. After a prolonged conflict, in 1680 slavery of the Indians was abolished, but negro slavery took its place.

From 1580 to 1640 the country was in the possession of Spain. In 1691 gold was discovered, and diamonds were found about twenty years later. These discoveries led to a rapid increase in the number of settlers. At the invasion of Portugal in 1807 by the French, Brazil became the residence of the royal family and was for fourteen years the seat of government. When King John VI returned, he left his oldest son, Dom Pedro, as prince regent of Brazil, but in 1822 the country proclaimed its independence and made the regent emperor. Dom Pedro was succeeded by his son, Dom Pedro II, who was invested with the crown at fifteen years of age. He proved a wise and able ruler, and during his long administration the country made rapid advancement; but notwithstanding Dom Pedro's excellent rule, there was a growing desire for a republican form of government, and in 1889 the royal family retired to France, and the present government was organized.

The most important event of late Brazilian history was the intervention of the country in the World War. Germany's submarine policy caused intense feeling in Brazil, and in 1917 there were serious anti-German demonstrations in various parts of the republic. The Brazilian Congress, which had originally declared for neutrality, authorized President Gomes to revoke his proclamation of neutrality, and in October, 1917, the government declared war on Germany. The small but effective navy of Brazil coöperated with the navy of the United States in the fight against submarines.

Related Articles. Consult the following titles for additional information:

Amazon
Bahia
Madeira River
Manaos
Para
Parana
Pernambuco
Santos
São Paulo
São Francisco
Tocantins
Uruguay River

BRAZIL NUT, or **PARA NUT**, the seed of a tree found in Brazil, especially along the Amazon and the Orinoco rivers. In America the nut, with its dark brown, wrinkled shell, is commonly known under the name of *nigger-toe*. It may not be commonly known, however, that the nuts when on the tree are packed together, about twenty in a lot, in a hard-shelled seed vessel something the color of a cocoanut and nearly half a foot in diameter. Brazil nuts are a popular delicacy, and are the source of a useful lubricating and fuel oil. The tree which bears the nuts is a stately plant which sometimes reaches a height of 150 feet. It has bright green leaves and cream-colored flowers.

BRAZIL'WOOD, a kind of wood yielding a red dye, obtained from several trees native to the West Indies and Central and South America. The wood is hard and heavy, and as it takes on a fine polish it is used by cabinet-makers for various purposes. The dye is obtained by reducing the wood to powder and boiling it in water.

BRAZOS, *brah'zose*, the principal river wholly within Texas, formed by the junction of Clear and Salt forks. It flows southeast by a winding course and empties into the Gulf of Mexico, forty miles southwest of

Galveston. It has a length of 900 miles and is navigable during high water for 300 miles, and at all seasons for forty miles from the Gulf.

BREACH OF PROMISE, the term generally applied to the refusal of one of the parties to a marriage engagement to carry out the promises made. Legal action against the violator of a promise to marry is more common in America than in Europe, and such actions are brought by women against men in by far the majority of cases. The feelings of the injured party are usually solaced by the award of damages, and it is obvious that breach of marriage suits are sometimes a polite form of blackmail. In American law, incurable physical unfitness for marriage, contracted by one party after the engagement was made, is a legal reason for the other's refusal to marry. The defendant in breach of promise suit is also legally justified in refusing to keep his promises if it can be proved that the other party has been guilty of immoral conduct.

BREACH OF THE PEACE. See MISDEMEANOR.

BREAD, *bred,* a preparation of flour or meal and water, considered the mainstay of the people in nearly all civilized countries. During the World War the expression "reduction of the bread ration" was heard frequently, and it always carried with it the idea of serious food shortage in the country in question. The term does not mean any particular form of meal preparation, but a very wide variety of baked foods. To the American or Canadian it means primarily a large, light loaf of white-flour bread, and secondarily, loaves of a darker color, in which rye, graham, whole wheat or some other grain is the principal ingredient. In many parts of Europe, however, the peasants eat rye, barley or oat bread almost exclusively, either in the form of loaves or small cakes, and rarely taste a wheat-flour bread. Indeed, few know how to use the latter.

Kinds of Bread. There are numerous kinds of bread, according to materials and methods of preparation, but all may be divided into two classes: *fermented, leavened* or *raised,* and *unfermented, unleavened,* or *not raised.* Originally all bread was unleavened, but both kinds have been in use from early Bible times. Of the raised breads, that made with yeast from white flour has always been the favorite brand used in North America, but the necessity for conserving wheat flour brought into use a number of wheat substitutes during the World War. Biscuits, muffins and cornbread are other forms of raised bread, but they are made with baking powder or soda, each of which has an effect similar to yeast (see YEAST; BAKING POWDER).

Unleavened breads are also popular. They include *aerated* bread, made with water charged with carbonic acid; *salt-rising* bread, in which a sour batter of cornmeal and milk provides the necessary lightness; the *oaten cakes* and barley meal *bannocks* of the Scotch; the *corn pone* of the Southeners; crackers (called *biscuits* in England), and pancakes made from self-rising flours.

Food Value of Bread. Generally speaking, all kinds of bread are nutritious, the most important element entering into their composition being carbohydrates (starch and sugar). Wheat bread made from high-grade patent flour is 56.5 per cent, or over half, carbohydrate, while in whole-wheat bread the proportion is 49.7 per cent, in cornbread 46.3, in rye bread 53.2 and in crackers 71.9 Good bread is not only nutritious but wholesome, for under right conditions it is completely digested and it has no waste. A diet of bread alone, however, would not be wholesome, because bread is poor in protein and needs to be eaten with meat and vegetables. Heavy, soggy bread is to be avoided because when chewed it forms in solid lumps that are very hard to digest. The tendency of the inside of hot bread to do this is the basis for the popular prejudice against bread fresh from the oven. If such bread is finely chewed and mixed with saliva before being swallowed it is perfectly digestible. Breads with a hard crust such as the so-called Vienna rolls, are of special value because they make vigorous chewing a necessity.

See articles on the various cereal grains, such as wheat, barley, rye, etc.

BREAD'FRUIT, a large round fruit of a pale-green color, six or eight inches in diameter, marked on the surface with irregular six-sided depressions, and containing a white and somewhat stringy pulp, which when ripe becomes juicy and yellow. The tree that produces it grows on the islands of the Indian and South Pacific oceans. It is about forty feet high, with large and spreading branches and large, bright green leaves over

a foot in length. The fruit is generally eaten immediately after being gathered, but it is also often prepared so as to keep for some time, either by baking it whole in closed, underground pits, or by heating it into paste and storing it underground, where a slight fermentation takes place. The eatable part lies between the skin and the core and is somewhat of the consistency of new bread.

BREADFRUIT

Mixed with cocoanut milk it makes an excellent pudding. The inner bark of the tree is made into a kind of cloth. The wood, when seasoned, closely resembles mahogany and is used for the building of boats and for furniture. Though the tree can be grown in Southern Florida the fruit cannot be marketed in the North because it will not keep when shipped a long distance.

BREAK'WATER, a work constructed in front of a harbor to serve as a protection against the violence of the waves. The name may also be given to any structure which is erected in the sea, with the object of breaking the force of the waves without and producing a calm within. Breakwaters are usually constructed by sinking loads of unwrought stone along the line where they are to be laid, and allowing them to settle under the action of the waves. When the mass rises to the surface, or near it, it is surmounted with a pile of masonry, sloped outwards in such a manner as will best enable it to resist the action of the waves. The great breakwaters are those of Cherbourg in France, Plymouth in England, Delaware Bay and Buffalo in America and Valparaiso in Chile. In less important localities floating breakwaters are occasionally used. These are built of strong open woodwork, partly above and partly under water, divided into several sections and secured by chains attached to fixed bodies. The breakers lose nearly all their force in passing through the beams of such a structure.

BREATHING, one of the processes essential to the life of the body. A man can go for many days without food and live; he can exist for perhaps a week without food and water. If, however, the process of breathing is interrupted, death comes within a period measured in minutes. By breathing is meant the passage of air into and out of the lungs. The two acts involved are called *inspiration* (breathing in) and *expiration* (breathing out). As air is drawn into the lungs oxygen is given up to the blood, and a waste matter called carbon dioxide is taken from the blood. In the act of expiration this waste matter is expelled into the air. Carbon dioxide is poisonous to animal life, and when it is not carried out of the system it causes death. It is, however, vital to the life of plants, and they absorb it in large quantities. Since plants also exhale oxygen, plants and animals help each other to live by keeping the proportions of these gases properly balanced.

Breathing is normally a mechanical process; it goes on without our taking thought of it. The number of breaths taken by the adult in good health varies from sixteen to twenty a minute, but this number may be increased by violent exercise or some physical disorder, such as hysteria. When air is breathed in, the ribs are raised and the chest expands; when the act of expiration takes place the ribs return to their normal position. In the ordinary process of breathing the average adult inspires and exhales with each breath about thirty cubic inches (one pint) of air, called *tidal* air. A forced inspiration, however, may bring an additional 100 cubic inches into the lungs, called *complemental* air. No matter how forcefully one exhales, however, there remain in the lungs about 100 cubic inches of *residual* air. The quantity of air which one can expire after the deepest possible inspiration is one's *vital*

capacity. This varies, of course, in different persons.

For the relation of breathing to health consult the article Physical Culture, subheads Pure Air a Necessity and Breathing Exercises.

BRECKINRIDGE, John Cabell (1821–1875), an American soldier and statesman, Vice-President of the United States during Buchanan's administration. He was educated at Centre College, Ky., and began the practice of law, but the outbreak of the Mexican War, in which he served as major of volunteers, interrupted his career. After the war Breckinridge was elected to the Kentucky legislature, and in 1851 and 1853 was sent to Congress by the Democrats. In 1856 he became Vice-President of the United States, and in 1860 was nominated for President by the extreme Southern Democrats, who withdrew from the national convention that was held in Charleston, S. C. He received the electoral vote of all the slave states except Virginia, Kentucky, Tennesee and Missouri. In 1861 he took his seat in the United States Senate as successor to John J. Crittenden, but resigned December 4th to enter the Confederate army, in which he was first appointed brigadier-general, then major-general. From January, 1864, 'till April, 1865, Breckinridge was Secretary of War in Jefferson Davis's Cabinet. His last years were spent in law practice.

JOHN C. BRECKINRIDGE

BREED'ING, the science of improving races or breeds of domestic animals and plants, or modifying them in certain directions, by continuous attention to their pairing in the case of the former and to cross-fertilization in the latter. Animals show great susceptibility of modification under systematic cultivation; and there can be no doubt that by such cultivation the sum of desirable qualities in particular races has been greatly increased. Individual specimens are produced possessing more good qualities than can be found in any one specimen of the original stock; and from the same stock many varieties are taken characterized by different advantages, the germs of all of which may have been in the original stock but could not have been developed at the same time in a single specimen.

When an effort is made to develop rapidly, or to its extreme limit, any particular quality, it is always made at the expense of some other quality, or of other qualities generally, by which the intrinsic value of the result is necessarily affected. High speed in horses, for example, is only attained at the expense of a sacrifice of strength and power of endurance. So the celebrated merino sheep are the result of a system of breeding which reduces the general size and vigor of the animal and diminishes the value of the carcass. Much care and judgment, therefore, are needed in breeding, not only in order to produce a particular effect, but also to produce it with the least sacrifice of other qualities.

Breeding, as a means of improving domestic animals, has been practiced more or less systematically wherever any attention has been paid to the care of live stock, and nowhere have more satisfactory results been obtained than in Great Britain. The United States, France and Germany have also been successful in the development of high-bred live stock.

BREMEN, *brem'en,* Germany, a city in the northwestern part of the country, capital of the state of Bremen. Next to Hamburg it is the chief German port, and it is the commercial center of Northwestern Germany. Bremen is situated on both banks of the Weser River, forty-six miles from the North Sea. It has four harbors, and before the World War was visited by ships from all over the world. It was from Bremen that the commercial submarine *Deutschland* sailed for America, in June, 1916.

The city is divided into old and new towns, as is true of many European municipalities, the new town being on the left bank of the Weser. In this section one sees the broad, handsome streets and fine buildings of an up-to-date city. The old town, forming the business section, is surrounded by fine promenades and gardens, constructed on the ancient ramparts. The chief manufactures of the place are woolen and cotton goods, cigars, paper, starch and liquors, and there are shipbuilding yards and sugar refineries. In November, 1918, there was a great uprising of mutinous sailors in Bremen, as in other German ports. Population, 1910, 246,827; in 1918, 299,526.

BREMERHAVEN, *brem'er hah v'n*, GERMANY, a port on the estuary of the River Weser, in the state of Bremen, situated thirty-eight miles north of the city of Bremen. It is an important shipbuilding center, and during the World War was the headquarters of the German submarine fleet. The dry docks and repair shops of the North German Lloyd Steamship Company are located at Bremerhaven. The city is connected with Geestemünde, across the River Geeste, by a drawbridge. Population, 1910, 24,165.

BRENT GOOSE, or **BRANT GOOSE**, a wild goose found in most parts of the northern hemisphere, remarkable for its length of wing and the extent of its migration. The bird is about twenty-six inches in length. It may be seen as far south as the Carolinas in winter, but its nesting grounds are far to the north, beyond the Arctic Circle. See GOOSE.

BRESCIA, *bresh'shah*, ITALY, capital of a province of the same name, situated in a plain at the foot of the Alps, fifty-two miles east of Milan. Among its chief buildings are the new cathedral, the Rotonda, or old cathedral, the city hall, called La Loggia, and the Broletto, or courts. Besides these, there are a museum of antiquities, a botanic garden, a fine public library and a theater. Near the town are large iron works, and the firearms made here are among the best that are made in Italy. There are also silk, linen and paper factories, tanyards and oil mills. Brescia was the seat of a school of painting of great merit. The city became the seat of a Roman colony under Augustus about 15 B. C. In the Middle Ages it rose to be an important city republic, and in the beginning of the fifteenth century it was under the protection of Venice. In 1815 it was assigned to Austria, by the Vienna Treaty, and in 1859 to Sardinia, by the Treaty of Zurich. Population, 1915, 89,662 (estimate).

BRESLAU, *bres'low*, GERMANY, an important industrial city and the capital of the province of Silesia, attractively situated on the Oder River, 202 miles southeast of Berlin. The public squares and buildings are handsome, and the fortifications have been converted into fine promenades. The cathedral, built in the twelfth century, the Stadthaus, the Church of Saint Elizabeth, and the Rathhaus, or town hall, a Gothic structure of about the fourteenth century, are among the most remarkable buildings. There is a flourishing university, with a museum, a library of 400,000 volumes, an observatory and other buildings.

In peace times Breslau is a flourishing manufacturing city, and its activities were vastly stimulated by the World War, during which it became a munitions center. It also enjoys an extensive trade. As it is near the former Polish border, the place has had a large permanent garrison. Breslau was the seat of a bishopric by the year 1000, and in the Middle Ages it was ruled successively by the kings of Poland, the dukes of Breslau and the kings of Bohemia. In 1741 it was conquered by Frederick II of Prussia. Population, 1918, 514,947.

BREST, FRANCE, a seaport in the northwestern part of the country, on an arm of the Bay of Biscay. Brest is 389 miles west of Paris by rail. It has one of the best harbors in France, and before the World War was the chief station of the French marine. When the United States entered the war and needed a great embarkation port in France, Brest was assigned to the Americans. The United States government built vast docks and spent millions of dollars in improving the harbor. More than 1,000,000 American soldiers entered France through Brest. The harbor entrance is narrow and rocky, and the coast on both sides is well fortified. Brest stands on the summit and sides of a projecting ridge, many of the streets being exceedingly steep. The manufactures are inconsiderable, but the city has for many years had an extensive trade in cereals, wine, brandy, sardines, mackerel and colonial goods. Population, 1911, 90,540.

BREST-LITOVSK, *brest lye tofsk'*, RUSSIA, formerly a first-class fortress in the western part of the country, capital of a district in the government of Grodno. It is situated about 100 miles east of Warsaw, at the junction of the Bug and Mukhavetz rivers. Captured and nearly destroyed by the Germans in the World War, Brest-Litovsk was made the headquarters of the German commander in occupied Russia, and here the Russian and German delegates met in 1917–1918 to negotiate the treaty of peace between Germany and Russia. This treaty, which was signed in March, 1918, foreshadowed the dismemberment of Russia, but the allies forced Germany to abandon it at the close of the war. Brest-Litovsk was a thriving commercial center before the war,

as it was situated at the junction point of railroads connecting Odessa with Königsberg and Moscow with Warsaw. Population, 1913, 63, 579.

BRETON, *bre toN′,* JULES ADOLPH (1827–1906), a French painter, who exhibited a genius for depicting the life of the peasants among whom he was born. His works are characterized by tender feeling, but they lack that strength and power which mark Millet's work. Among Breton's principal paintings are *Blessing the Grain; Return of the Gleaners,* his most celebrated work; *Planting a Calvary,* and *Song of the Lark.* The original of the last named is a prized possession of the Chicago Art Institute. Breton also wrote both poetry and prose. Among his literary works are *Jeanne, The Life of an Artist, A Peasant Painter* and *The Fields and the Sea.*

BREVET, *bre vet′,* an honorary title received by a commissioned officer, which gives him higher rank than that which he holds in his regiment. A brevet officer does not have his pay increased, nor does he enjoy seniority over officers of his own rank except when he is on the field. In the United States army brevet officers are addressed by the titles of their brevet rank, but in England it is customary to use both titles. Brevet titles have been conferred in the American army for conspicuous bravery.

BRE′VIARY, a book containing all the ordinary and daily services of the Roman Catholic Church, except those connected with the celebration of the Eucharist. It includes those prayers contained in the *Missal,* which are read or sung in the celebration of mass, and those of the *Ritual,* used for funerals, marriages and baptisms.

BREW′ER, DAVID JOSIAH (1837–1910), an American jurist, born at Smyrna, Asia Minor, the son of an American missionary. He was graduated at Yale in 1856, studied law with his uncle, David Dudley Field, and at Albany Law School, and practiced in Leavenworth, Kan. There he served successively as probate judge, district judge and justice of the state supreme court. He resigned the last position in 1884, after fourteen years' service, to become United States circuit judge. President Harrison appointed him Associate Justice of the United States Supreme Court in 1889, and he was a member of the Venezuelan Boundary Commission and arbitration tribunal.

BREW′ING, the process of manufacture of liquors not produced by distillation (which see), particularly beer and ale. When brewing is referred to, the making of beer at once comes to mind, as nearly all brewing is concerned with the making of that drink. (See BEER.) There are two processes employed—*malting* and *brewing.*

Malting. The first process consists in causing the grain to germinate, for the purpose of changing its starches into sugar. This is done by steeping the grain (barley) in large cisterns, in which it remains covered with cold water for three or four days. During this period the grain absorbs water, and it swells. Next this soft, pulpy grain goes to a germinating floor, where it remains nearly a week. Here the barley germinates—sends out tiny rootlets; care must be exercised that germination does not proceed too rapidly or continue too long. Germination is checked at the proper time by drying the grain in a kiln, at a temperature of 150° if paleness is required in the beer, and 200°, if browner color is desired.

Brewing. The grain, now called *malt,* is crushed between rollers and mixed with warm water, forming *mash;* in this state its temperature is gradually raised to about 160°. After the mash has been boiled to produce partial solution, by raising its temperature to nearly 200°, it is run into other tubs and allowed to stand from thirty to fifty minutes while the change from starch to sugar is completed. The mass is now known as *wort.* After it has been allowed to settle it is run into copper boilers and boiled with hops, in the proportion of about three bushels of wort to three pounds of hops. Cooling follows by passing this mixture either through or over cool pipes, ammonia being used for this purpose. Then in vats fermentation takes place. This is begun by adding one pound of yeast to every twenty gallons of wort; the mixture thus stands for a number of days, after which another period of settling follows. The mixture is now beer, and it is put into casks, where it is allowed to ripen for at least two months before being marketed.

In 1919 brewing ceased altogether in the United States, by virtue of war necessity which demanded all grains for foodstuffs. The revival of the industry was expected at the close of the war, but the Eighteenth Amendment to the United States Constitu-

tion, effective in January, 1920, prohibited the manufacture of all intoxicating beverages, except for medicinal use. Brewing thereafter was a useless art.

BREW'STER, DAVID, SIR (1781–1868), a Scotch physicist, one of the greatest scientists of the nineteenth century. He was educated for the ministry, but gave this work up to study science, to which he was first attracted by the lectures of Robson and Playfair. In 1808 he became editor of the *Edinburgh Encyclopedia* and the next year, in conjunction with Jameson, founded the *Edinburgh Philosophical Journal,* which later became the *Edinburgh Journal of Science.* Brewster was one of the founders of the British Association for the Advancement of Science and was its president in 1850. Among his inventions were the polyzonal lens, the kaleidoscope and the improved stereoscope. His chief works are a *Treatise on the Kaleidoscope, Letters on Natural Magic* and *Life of Newton.*

BREWSTER, WILLIAM (1560–1644), the leader of the *Mayflower* Pilgrims, was born at Scrooby and educated at Cambridge. He left the Established Church and founded a separate society in his house, and in 1608 went to Holland and opened a school at Leyden. He was made ruling elder, and after the voyage of the *Mayflower* (1620) he was the only spiritual teacher whom the Pilgrims had for years, but he did not administer the sacraments. He is venerated as the ruling spirit in the earliest New England colony.

BRIAND, *breaNd',* ARISTIDE (1863–), a French statesman who held the arduous position of Prime Minister of France for a year and a half during the World War. He was elected to the Chamber of Deputies by the Radical Socialists in 1902, and soon became favorably known for general ability and soundness of judgment. His discretion and poise were especially shown in the way he administered the law separating Church and State, a task that fell to him in 1906 as Minister of Public Instruction and Worship. Three years later Briand became Prime Minister, the first Socialist to hold that office.

The most important event of his Ministry was the great railway strike of 1910, which he broke by calling into military service the men engaged in the strike. Rather than protect the roads against which they were striking, the men returned to work. This incident shows how a man of radical tendencies will become conservative when burdened with great responsibilities, and it is significant that Briand was expelled from the Socialist party. He had the confidence and respect of the country at large, however, and after resigning the Premiership in 1911 he again held the high office for a brief period in 1913.

In August, 1914, the first month of the World War, Briand was appointed Minister of Justice in the Cabinet of Viviani. When this Ministry fell, in October, 1915, Briand for a third time headed the Cabinet, and was successful in averting a Ministerial crisis until March, 1917. Though he refused a place in the Cabinet formed by his successor, M. Ribot, he remained in Parliament and continued his vigorous support of the war.

BRIBERY, in law, the offering or giving of reward for the purpose of inducing the receiver to act unlawfully in favor of the giver. It is especially common in connection with public service. A bribe need not be money, but may consist of anything which constitutes a satisfaction, such as property, position or service. Before the law, both parties to the transaction are held equally guilty, and large fines and even imprisonment are the punishments inflicted.

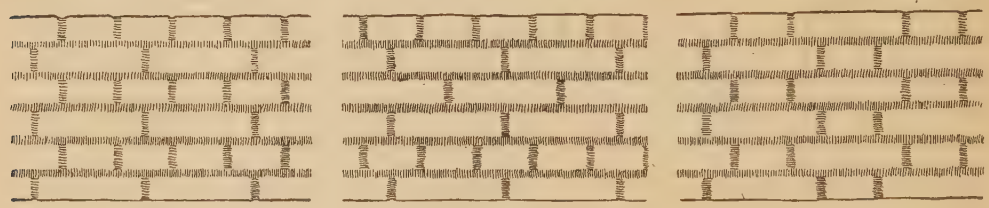
BRICK AND BRICKLAYING. Brickmaking is an art as old as civilization itself. In the *Book of Exodus* we read that the enslaved Children of Israel had to make bricks for their cruel taskmasters in Egypt. The Israelites molded their bricks out of clay and sand and dried them in the sun, and the straw which they used in their work served as a binding material. The Assyrians and Babylonians also knew the art of making sun-dried bricks, and many of these contain inscriptions which are of great historic value, since they constitute the only known record of people and events of the time in which they were made. The Romans also made and used bricks, and it was through these people that the art of brickmaking was introduced into England.

Modern Brickmaking. Clay is still the all-important ingredient, but kilns have supplanted the sun as a firing agent. In the manufacture of brick a good clay should be selected. This should be free from the remains of animals and plants and should

contain but little iron or lime. The clay should also contain one part sand to two parts clay. If this proportion of sand is not present, enough needs to be added to make the required proportion. The clay and sand in proper proportions are ground with water into a plastic mass, which is forced out of the machine through an opening that forms a column having the length and width of a brick. As this column comes from the machine it is cut by wires into bricks of the required thickness. These fall upon an endless belt that carries them either to a machine for re-pressing or to tram

Bricks are extensively used in building, since the erection of steel frame buildings in cities makes them specially valuable in the construction of walls. They are also used for foundations, sewers, cisterns and numerous other purposes. Paving brick are used in paving the streets of cities. Brickyards are found wherever brick clay can be obtained and there is a local demand for the brick.

Bricklaying. In many countries the only available material for house building is brick. The solidity and durability of a brick building depends largely upon the manner in



English bond. STYLES OF BRICKLAYING American bond. Flemish bond.

cars that take them to the drying sheds or drying tunnels, according to the plan of the plant. The bricks intended for finishing or facing either outside or inside walls are repressed in a steel mold to give them a smooth finish and sharp edges and corners. A good machine will make 100,000 bricks in a day. The bricks are fired in circular kilns about thirty feet in diameter and from ten to twelve feet high. The soft bricks are placed in these kilns so that the fire can surround them and raise all to the same temperature. Firing requires from six to ten days. The common bricks are heated to a cherry red, and the harder bricks to a white heat.

Varieties and Uses. There are numerous varieties of brick. The ordinary brick used in building and paving is eight inches long, four inches wide and two inches thick. Bricks of this style outnumber all other varieties. *Pressed* bricks are those repressed in the process of making and used for the finishings of exteriors and interiors. *Fire* bricks are made of fire clay and are used for filling the interior walls of fireproof buildings and lining the fire pots of furnaces and coal stoves. *Hollow* tiles are often used in constructing partitions in fireproof buildings. *Pavement* bricks contain lime, which fuses when they are burned and makes them very hard. They are known as *vitrified* brick.

which the bricks are laid. In laying the foundations of walls, the first courses should be thicker than the intended superstructure, and the projections thus formed, usually of quarter brick on each side, are called *set-offs*. Mortar composed of lime and sand is the common cement for brickwork. It should be equally and carefully applied. The most important thing in bricklaying is to see that the wall is properly bonded. The bricks of every course should cover the joints of the course below it, or, to use the bricklayer's phrase, the work must *break bond*. A layer of bricks is called a *course*. Bricks laid with their lengths in the direction of the course and their sides to the wall face, are called *stretchers;* those laid transversely, with their ends forming the wall face, *headers;* a layer of headers, a *heading course;* of stretchers, a *stretching course*.

The two kinds of bond almost exclusively used consist of alternate stretching and heading courses; and of a stretcher and header laid alternately in each course. The first bond is the strongest, but the second bond is the more ornamental and is in most general use. In order to strengthen the bond, bands of hoop-iron, tarred and sanded, are sometimes laid flatwise between the courses. This *hoop-iron bond* has superseded the old practice of using bond-timbers.

BRIDGE, a structure of wood, cement, stone, brick, iron, or other material, affording passage over a stream, valley, or another passageway, such as a railway or a carriage road. The earliest bridges were undoubtedly trunks of trees felled across narrow streams. These were followed by wooden structures built on a more elaborate plan. Bridges having wooden piers were in common use among the Romans; the *Pons Sublicus,* erected 621 B. C., is the oldest structure of the kind of which we have any record.

Arch Bridges. The Romans were also the first people to make use of the arch in building bridges and other structures. Portions of their great arched sewer, the *Cloaca Maxima,* still remain as a monument to the durability of their work. After the construction of such a work as this, the building of arched bridges across the Tiber must have been comparatively easy. One of the first examples of these structures was the bridge built by Augustus over the Nera, at Narni. It contained four arches, the longest having a span of one hundred forty-two feet.

STEEL ARCH BRIDGE AT NIAGARA FALLS

All large bridges are constructed after one of the following plans, arch, truss, tubular, cantilever, or suspension.

Truss Bridges. Iron was first employed in the construction of bridges about 1777. The first iron bridges were after the pattern of the stone arch, and cast-iron was used. The nature of the material gave the engineers greater latitude, however, and enabled them to construct arches with longer spans. The arch was gradually superseded by the girder and truss, and cast-iron by wrought-iron and steel, which is now the material almost universally employed in the construction of bridges.

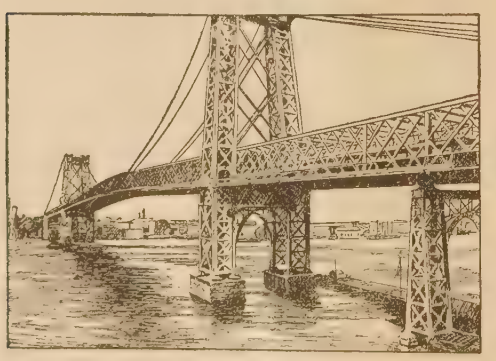
The abundance of timber in the United States led to its very general use for bridges for a long time. The necessity of spanning large streams early led to the invention of a framework which was self-supporting between the piers and also of sufficient strength to sustain any load that the bridge was required to carry. Such a structure is known as a truss. Trusses are of two kinds, simple and arched. A simple truss is one supported at its two ends without exerting any lateral pressure; an arched truss exerts both lateral and vertical pressure upon its supports. The first truss bridges were made of wood. The new Hell Gate bridge in New York has a remarkable span of 1,016 feet. This bridge was completed in 1916.

Tubular Bridges. A tubular bridge consists of a tube, either rectangular or circular, made by riveting steel plates together. The tube rests on piers and abutments, and the roadway passes through the tube or over the top. The most noted bridge of this pattern is the Britannia Bridge over the Menai Straits, in Wales. This bridge has two spans of 450 feet and two of 250 feet; the tube is made of cast and wrought iron, and is 1,380 feet long, 28 feet deep and 13 feet 8 inches wide in the clear. The tube contains a single track. At the time of its completion, the first Victoria Bridge across the Saint Lawrence River at Montreal was the most celebrated bridge in the world. Its total length was 1¾ miles; it contained 25 spans, the center one having a length of 330 feet, and each of the others of 242 feet, and cost about $7,000,000. Both of these bridges were designed by Robert Stephenson of England. The Victoria Bridge was replaced by one of the steel truss pattern in 1898.

From the standpoint of the engineer, the length of span is the most important factor to be considered in the construction of bridges. Usually, the longer the span, the greater the difficulties to be overcome; hence, bridges with long spans rank higher as works of engineering than those of short spans, even though the latter class may include bridges of greater length. Some of the most celebrated truss bridges in the United States are the following: that across the Ohio River at Cincinnati, having a span of 550 feet; the bridge of the Illinois Central Railway across the Ohio at Cairo, Ill., having a span of 518½ feet; and the celebrated

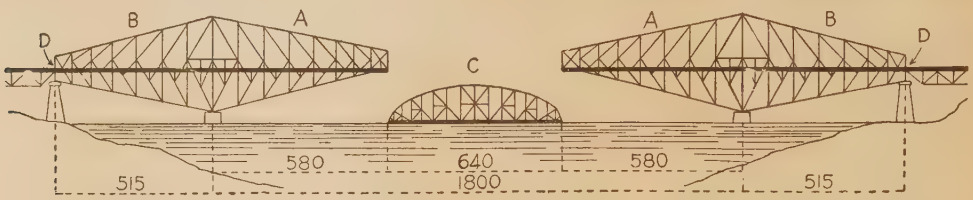
Eads Bridge at Saint Louis, having three spans, one of which is 515 feet, and the others 497 feet each. This bridge is of the arched truss type and has two railway tracks, two tracks for electric cars, a driveway and sidewalks. At the time of its construction the middle arch was the longest in the world.

Cantilever, or Suspension, Bridges. Bridges of the cantilever type are taking the place of the old style truss and arch in many places. A cantilever truss has a shore arm and a river arm, which are supported on a tower in such a way that they practically balance each other. The river arms are joined by a central truss, and the entire structure is so made that the strain of the load is very evenly distributed over the bridge. The cantilever truss has great advantage over other patterns from the point of economy in construction, since temporary structures are required only under the shore arms. The river arms are extended from the towers and are self-supporting during construction. When joined by the center truss, the structure is complete. The first important bridge of this



WILLIAMSBURG BRIDGE AT NEW YORK

type was erected over the Niagara River by the Michigan Central Railroad in 1882. The total length of this bridge is 910 feet; the span between the towers is 470 feet, and the bridge is 245 feet above the river. Other noted bridges of this type are that over the Saint John's, in New Brunswick; that over the Hudson, at Poughkeepsie; that over the Mississippi, at Memphis, and that over the Firth of Forth, in Scotland. The largest cantilever bridge ever projected was that to span the Saint Lawrence above Quebec, having a central span of 1,800 feet. Before it was completed this bridge fell, in 1916, ruining the structure and causing the loss

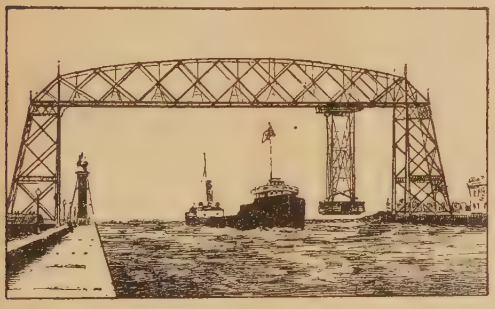


DIMENSIONS OF THE GREAT CANTILEVER BRIDGE AT QUEBEC
It was the central span, 640 feet in length, which fell in 1916, after it had been raised almost to its position.

of seventy-four lives. The last span was eventually put up safely, in September, 1917.

Suspension Bridges. A suspension bridge has a platform swung on cables which pass over towers, and are anchored at the abutments. The first modern suspension bridge in England was built about 1819. The great Suspension Bridge over the Niagara River, completed in 1854, marked an epoch in bridgebuilding and in the history of the country. This was the first great railroad bridge in America and was likewise the beginning of the westward extension of great railway systems. This bridge had a span of 821 feet and a width of 15 feet; it had two decks, the upper containing two railway tracks, and the lower a carriage road and sidewalks. Each deck was supported by two cables 10½ inches in diameter containing 14,040 wires each. The platforms were held in position by being attached to the cables by small cables of a similar make. In 1897 this bridge was replaced by one of the steel-arch type. A suspension bridge nearer the falls, and carrying a carriage road and sidewalks, was also replaced by a steel arch in 1898. This bridge long had the distinction of having the longest arch in the world, its span being 840 feet. Suspension bridges are now common in Great Britain and Europe. The Brooklyn Bridge, over East River, connecting the cities of

New York and Brooklyn, is one of the most celebrated suspension bridges. This bridge was completed in 1883. The Brooklyn Bridge, however, is exceeded in magnitude by the Williamsburg or East River Bridge, and the Manhattan Bridge, located farther up the river. The central span of the East River Bridge is 1,600 feet between towers, and the land span at each end is 596 feet; it has an approach 2,500 feet long on the New York side, and one 1,750 feet long on the Brooklyn side. The entire height of the towers is 335 feet; the platform is 110 feet wide and provides on its upper deck for an elevated railway track, two footpaths and bicycle paths, while the lower deck is to contain two electric railway tracks on each side of the elevated railway, and a driveway. A suspension bridge can be made a thing of beauty as well as of utility. A



AERIAL BRIDGE AT DULUTH

special form of suspension bridge, commonly known as the aerial bridge, has its only American example at Duluth. A rigid steel frame, supporting a cage or platform, is hung on elevated tracks, leaving the channel entirely free.

Drawbridges. Drawbridges are so constructed that they can be opened to admit of the passage of vessels. The draw may constitute the entire bridge, or it may be only a single span in a long bridge. Drawbridges are of three types: the swing bridge, consisting of a span supported on a center pier and revolving on a turntable; a lift bridge, so constructed that it can be raised to a sufficient height to allow vessels to pass under in the clear, and a lift bridge of the bascule type. The bascule bridge is adapted to narrow channels, where a center pier would obstruct navigation, and is gaining favor as a drawbridge over canals. In a bridge of this type the span is made in two parts of equal length. When the bridge is closed, these parts form a complete arch.

Concrete Bridges. Nearly all concrete structures serving as bridges are more properly viaducts. The most famous of recent architectural triumphs of this nature is the Tunkhannock Viaduct, in New York state, one and a half miles in length and 240 feet high, completed in 1915. Small concrete bridges are popular in parks, and here beauty of design may make them extremely attractive. These are further discussed in the articles CONCRETE and VIADUCT.

BRIDGE OF SIGHS, a bridge in Venice associated with the period of the Doges, and so called because condemned prisoners formerly passed over it on their way to the place of execution. It spans the canal between the

THE BRIDGE OF SIGHS

Doge's Palace and the state prison, and is a beautiful structure with an arched top and closed sides. Its builder, Antonio Contino, lived in the sixteenth century. Byron refers to this bridge in his *Childe Harold.*

A covered passageway in New York between the Tombs and Criminal Courts Building is also called Bridge of Sighs.

BRIDGEPORT, CONN., founded in 1665 under the name of Pequannock, and known successively as Fairfield Village (from 1694) and Stratfield (from 1701), was incorporated under its present name in 1800.

It is the second city in the state in size, New Haven being larger, is fifty-eight miles northeast of New York City, and the county seat of Fairfield County. The city is served by the New York, New Haven & Hartford Railroad, and is on Bridgeport harbor, connecting with Long Island Sound; steamboats run daily to New York. There are three parks, containing 250 acres, Seaside Park being on the Sound.

There are many beautiful buildings; among them are a Federal building, a courthouse, Burroughs' Public Library and the Barnum Memorial Institute, in memory of P. T. Barnum, the showman, who made Bridgeport the headquarters of his circus. Other institutions of note are a home for aged women, the Protestant Orphan Asylum, Saint Vincent's hospital and the Young Men's Christian Association. The manufactures are important and varied; the leading industries are iron and steel mills and ammunition works. Population, 1910, 102,054; in 1917, 124,724 (Federal estimate).

BRIDGES, ROBERT (1844–), an English poet, the successor of Alfred Austin as poet laureate of England (1913). He was born on the Isle of Thanet, and educated at Eton and Corpus Christi College, Oxford. Having studied medicine at Saint Bartholomew's, London, he practiced his profession in that city until his retirement in 1882. Since that time he has devoted his life to literature, reaching notable rank as a poet. He has written eight plays in imitation of the classical style, a large body of lyrics, about three score sonnets in sequence, called *The Growth of Love,* a poetical version of *Eros and Psyche,* an essay on Keats and a study of Milton's prosody. His poetical works were republished in 1913 by the Oxford University Press. Dr. Bridges' verse shows his mastery of technique. He is the poet of the intellectual man rather than of the masses, but has written a number of beautiful lyrics that would appeal to anyone who enjoys rhythm. See POET LAUREATE.

BRIDGE WHIST. See WHIST.

BRIDG'MAN, LAURA DEWEY (1829–1889), a remarkable blind deaf-mute. At the age of two a severe illness deprived her of sight, hearing and speech, and to some extent, also, of smell and taste. She was placed in the Perkins Institution for the Blind, Boston, at the age of eight, and Dr. Howe undertook her education. She made rapid progress and acquired a knowledge of geography and arithmetic, learned to do household work and to sew, both by hand and on the machine. After receiving her education, Miss Bridgman taught in the Perkins Institution.

BRIGADE, *brig ayd'*, a unit of an army, in the United States and British armies consisting of about 4,000 men, under command of a brigadier-general. It comprises three regiments (see REGIMENT). Three or four brigades comprise an army corps, under command of a major-general. See ARMY.

BRIG'ANDAGE, the system of robbery by bands of men in secluded spots on highways or in mountains. It is of very ancient origin, but it has always flourished especially in loosely governed countries. In British history the most celebrated brigand was Robin Hood, and in later times Dick Turpin, while in Germany the so-called robber barons attained special fame. For years they practically held the southern part of the country at their mercy and were not effectually crushed until after the Thirty Years' War. Spain has always been a particularly favorable field for outlaws, of whom Don José Maria, whose name is perpetuated in Merimee's *Carmen,* was probably the most famous. In more recent times the brigands have prospered more especially in Italy, where Fra Diavolo, the monk bandit, practiced his profession.

In very recent times a peculiar type of brigandage, combining patriotism and robbery, has grown up. It was brigands of this class who kidnaped Miss Ellen Stone and her companion in 1901 in Macedonia and held them for a large ransom, which was finally paid by the United States. It is now plain that these brigands were the close allies, if not paid agents, of the famous Macedonian committee, which was seeking to secure the independence of the country and used this method of securing funds. Brigandage in the United States has taken the form chiefly of train robberies, and though such crimes are becoming constantly more rare as the Western states become more closely populated, they still occur in the passes of the Rocky Mountains. The most famous of all of American brigands was Jesse James.

BRIGHT, JOHN (1811–1889), an English orator and statesman, identified with the free-trade and other democratic movements

of his country. He first became known as a leader in the Anti-Corn-Law League (see CORN LAWS). In 1843 he was chosen a member of Parliament for Durham, and there he distinguished himself as a strenuous advocate of free trade and reform. He was in 1857 returned for Birmingham, and soon afterward he made speeches against the policy of great military establishments and wars of annexation. During the American Civil War he was one of the few English statesmen who were outspokenly in favor of the Union cause. In 1865 Bright took a leading part in the movement for the extension of the franchise and strongly advocated the necessity of reform in Ireland. He was, however, opposed to Home Rule for Ireland, and thereby lost the regard of Gladstone, to whom he was deeply attached. Bright remained prominent in public life until the year of his death.

BRIGHTON, *brī' ton*, ENGLAND, a maritime town in the country of Sussex, forty-seven miles south of London. In front of the town is a massive sea wall, with a promenade and drive over three miles in length, one of the finest in Europe. Brighton has no manufacturers, but it is especially famous as being the most fashionable watering-place in England. Londoners go there in such numbers that the place is sometimes called "London-by-the-Sea." It owes its rise to the favor shown it by George IV, when Prince of Wales. Population, 1911, 131,250.

BRIGHT'S DISEASE, a name given to various forms of kidney disease. The urine in such cases contains albumen and is of less specific gravity than usual. The common form of the disease was first described by Dr. Richard Bright in 1827. Anaemia and dropsy are typical symptoms, and in the final stages convulsions usually occur. People with chronic Bright's disease sometimes live for several years, as the disease may be held in check by hygienic measures. A warm, healthful climate is a great advantage. Any noticeable disorder of the kidneys or their functions should have the prompt attention of a reliable physician; there may be danger in delay.

BRIMSTONE, a name for sulphur. In purifying sulphur it is customary to melt it in a closed vessel, permit it to settle, and then pour it into cylindrical molds. In these it becomes hard, and is known in commerce as *roll brimstone*. See SULPHUR.

BRISBANE, *briz'bayn*, ARTHUR (1864-), an American newspaper editor, said to be the highest-salaried journalist in the world. He entered the newspaper field as London correspondent of the New York *Sun*, then became editor of its evening edition, and later for seven years was managing editor of the New York *World*. In 1897 he joined the staff of William Randolph Hearst (which see), as editor of the New York *Journal*. His sphere widened as Hearst acquired many newspaper properties, for Brisbane's editorials go to numerous Hearst daily papers. By many people he is considered an illogical writer, preaching class doctrines and appealing mainly to those who believe everything they see in print; others see in his editorials panacea for many public ills. He is a master of short, pithy sentences, and insists that his paragraphs shall contain but few lines each, no matter how long an article may be. He has written, also, *Mary Baker Glover Eddy*, a biography.

BRISBANE, AUSTRALIA, the capital of Queensland, is a well-built, prosperous city twenty-five miles from the mouth of the Brisbane River and 500 miles north of Sydney. The place is a center of the wool trade, and has regular steamship connection with European and Australian ports. Boot and shoe making, soap manufacture, brewing and tanning are included among its industries, and the city has two cathedrals, four parks, a university and several other educational institutions. Brisbane is the out-growth of a penal colony established in 1825 and abandoned in 1839. Since 1842 it has grown rapidly. Population in 1911, 141,342; in 1914, within a ten-mile radius, estimated, 154,000.

BRISTLES, *bris's'lz*, the stiff, coarse, glossy hairs of the hog and the wild boar, especially the hair growing on the back. They are extensively used by brushmakers, shoemakers and saddlers. The American market is supplied by the meat-packing houses and by importations from Europe. Russia has in the past supplied the finest qualities, which are worth about $250 or $300 per hundred pounds. See BRUSH.

BRISTOL, CONN., founded in 1728, incorporated as a city in 1911, and named for Bristol, Eng., is eighteen miles southwest of Hartford, on the New York, New Haven & Hartford, which reached the town in 1849. The fifty manufacturing establishments em-

ploy over 5,800 people; chief among these may be named a ball-bearings factory, a clock factory, a silver plate works and a manufactory of fishing rods. The city purchased its waterworks in 1914. There are three banks, a hospital and a library. Population, 1910, 13,502; in 1917, 16,318 (Federal estimate).

BRISTOL, England, a cathedral city situated at the junction of the rivers Frome and Avon, partly in Gloucestershire, partly in Somersetshire, but forming a county in itself. It is one of the oldest cities in England, having existed before the Roman invasion. John Cabot sailed for the New World from Bristol in 1497, and traders from the place helped to colonize Newfoundland.

The town is built partly on low grounds, partly on eminences, and has some fine suburban districts, such as Clifton, on the opposite side of the Avon, and connected with Bristol by a suspension bridge 703 feet long and 245 feet above high-water mark. The most notable public buildings are the cathedral, founded in 1142, the Church of Saint Mary Redcliff, said to have been founded in 1293 and perhaps the finest parish church in the kingdom, the guild hall, the museum and the library. Bristol has glass works, potteries, soap works, tanneries, sugar refineries, chemical works, ship-building yards and machinery works. Coal is worked extensively within the limits of the borough. The export and import trade is large and varied, and the city is one of the most important ports of Great Britain, as well as a leading cattle market. There is a harbor in the city itself, and the construction of new docks at Avonmouth and Portishead gave a fresh impetus to the trade. Population, 1911, including Clifton, 357,059. It was then the seventh largest city in England.

BRISTOL, R. I., founded in 1680 and named for Bristol, Eng., is fifteen miles southeast of Providence, on Narragansett Bay and on the New York, New Haven & Hartford Railroad. There is here a large rubber company with over 3,300 employes. The town common contains twenty acres. Population, 1910, 8,565; in 1917, 9,778 (Federal estimate).

BRISTOL, Tenn., and **BRISTOL**, Va., is a city almost exceptional in America, for it lies in two states, the main street being the dividing line. The Tennessee section is in Sullivan County; the Virginia part, in Washington County. Two city governments are required, but in other respects the community is one city. The Norfolk & Western, the Southern and the Virginia & Southwestern are the principal railroads. The section is rich in coal, iron and timber. King's College (Presbyterian), Sullin's College and the Southwest Virginia Institute are here, and there is a public library. Population, 1910, 13,395; in 1917, 15,983 (Federal estimate), about half being in each state.

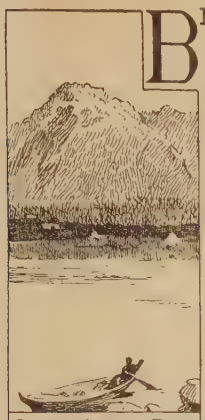
BRISTOL CHANNEL, an arm of the Irish Sea, indenting the coast of Great Britain between Wales and the southern peninsula of the island. It is about eighty miles long, and varies in width from five to fifty miles, having a shore line of 220 miles. It receives the waters of the Usk, Wye, Severn, Avon and several other rivers. The channel is noted for its high tides, which in the narrowest places sometimes rise forty feet. Lundy Island is situated at the entrance.

BRITISH AMERICA, a term sometimes applied to the British possessions in the Americas. In it widest sense it embraces Canada and Newfoundland, British Guiana, British Honduras, the Bermudas, the British West Indies and the Falkland Islands. In a narrower sense it refers to British territory north of the United States. The term is little used at the present time.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, a society organized in 1831, mainly through the exertions of Sir David Brewster, whose object was to assist the progress of discovery and to disseminate the latest results of scientific research, by bringing together men eminent in all the several departments of science. Its first meeting was held at York on September 26, 1831. Since then it has met annually in different parts of the United Kingdom and twice in Canada, in Montreal in 1884 and Toronto in 1897. The sessions extend generally over about a week. The society is divided into sections, which, after the president's address, meet separately for the reading of papers and for conference. Lectures and other general meetings are usually held each evening during the meeting of the association. The yearly revenue of the association is more than sufficient to meet its expenses, and the surplus is appropriated for the pursuit of various lines of

SELKIRK GLACIER
In the Rocky Mountains, British Columbia

scientific investigation. Because of war conditions no meetings were held in 1917 and 1918.


On the Skeena River

BRITISH COLUMBIA, the westernmost province of the Dominion of Canada, stretching northward from the United States boundary along the Pacific Ocean to Alaska, then to the west of Alaska to Yukon Territory. Its length from north to south is 740 miles, and its greatest length from east to west, 620 miles. The area, including islands, is 355,855 square miles, or larger than that of California, Washington and Oregon combined.

Until 1912 it was Canada's largest province, but in that year the extended boundaries of Quebec and Ontario made it third in size. The population in 1911 was 392,480; two of every three people are males. One-third are of English birth or descent; one-fifth are Scotch; 20,000 are native Indians, and a like number are Chinese. The latter race is not likely to increase in number, for the province has placed a heavy tax upon the importation of Chinamen. There are many Scandinavians, Italians, French and Japanese; before the World War many Germans lived in the province.

The Land. The Rocky Mountains extend through the entire province from north to south. In the southern part they are 450 miles wide; in the northern part they narrow to about 325 miles. At the south their average elevation is about 10,000 feet; in the north, 5,000 feet. The highest peak in the province is Mount Robson (13,068 feet). Through numerous passes the rivers reach the sea and the railroads run to coast cities. The most famous of these are Crow's Nest Pass and Kicking Horse Pass, which are utilized by the Canadian Pacific Railroad, and Yellowhead Pass, crossed by the Grand Trunk Pacific.

Minor chains of the Rocky Mountains system are the Purcell and the Selkirk mountains, the Gold Range and the Coast Range. Along the coast hundreds of fiords give the shore line an appearance resembling that of Norway. These are so irregular that British Columbia has a shore line of nearly 7,000 miles.

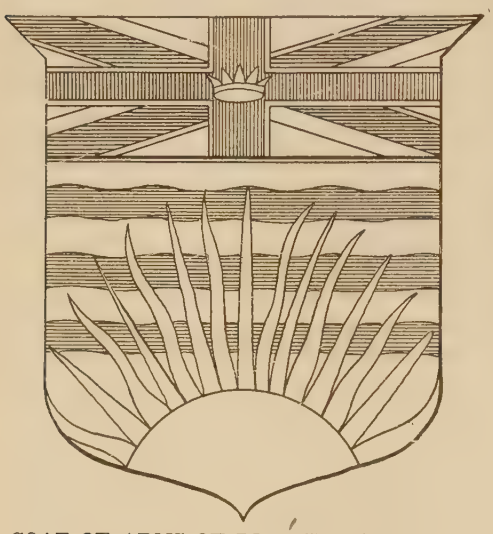
Drainage. The principal rivers are the Columbia, which drains the southeastern portion, the Frazer, which traverses the province for a distance of 750 miles, and the Skeena and Stikine, all of which flow into the Pacific and are navigable for large boats in the lower parts of their courses. The northeastern portion of the province is drained by the Peace and the Liard rivers, which find an outlet through the Mackenzie. Between the mountain ranges are a number of long, narrow lakes, which are really expansions of the rivers. The most important of these are Okanagan, Arrowhead and Kootenay. The surrounding mountains have altitudes ranging from 8,000 to 10,000 feet and are covered with snow throughout the year.

Climate. British Columbia has on the whole a milder climate than other provinces in the same latitude. This is due to the warm winds which blow from the Pacific and along the coast and for some distance into the interior. At Vancouver the yearly temperature ranges from about 37° to 60°. East of the Coast Range there is greater difference between summer and winter, and the eastern portion of the province has extremely cold winters and hot summers. The rainfall varies greatly from the coast inland. The Coast Range deprives the winds of much of their moisture, and upon the western slopes of these mountains the annual rainfall varies from 115 inches in the northern part to thirty-two inches at Victoria, while in the valleys in the interior it is about 15 inches. Lofty ranges of the Selkirks and the Rocky Mountains deprive the atmosphere of still more moisture, and the winters in this region are characterized by deep snows, which remain upon the mountains throughout the year and furnish the source of most of the streams that rise in that locality.

Agriculture. Wherever the surface makes agriculture possible the soil is fertile; the plains and valleys are well adapted to wheat, oats and other cereals, but agricultural development naturally has to proceed near lines of transportation. The entire province south of 52° and east of the Coast Range up to 3,500 feet is a grazing country, and a farming country where irrigation is possible.

These fertile lands south of 52° contain about 3,000,000 acres; north of that latitude are three times as many acres of agricultural land, most of it yet to be developed. Oats is the largest crop; wheat is second.

Minerals. The annual production of minerals in the province totals about $30,000,000. Copper is mined in greater value than any other metal, the output being worth over $10,000,000; coal is next in value in mining operations, with an output of about $6,000,000; about $1,500,000 in silver is taken yearly. There is also zinc, building stone, cement, coke, lead, gypsum and a little platinum.



COAT OF ARMS OF BRITISH COLUMBIA

The Union Jack at the top, with the ancient crown of England blazoned in gold over the center, represents the unity of British Columbia with the British Empire and its allegiance to the Crown. The golden setting sun symbolizes the position of the province as the westernmost part of the Dominion, and the wavy bands of blue represent the sea, symbolic of the province's maritime importance.

Forests. The forest area is estimated at around 180,000,000 acres, including sparsely timbered lands. The stand of merchantable timber is estimated by the Chief Forester of the province at over 400 billion feet; the most important tree is the Douglas fir. It is claimed that the British Columbia climate can produce as much timber in sixty years as can be grown elsewhere in Canada in a century. British Columbia contains more than half the standing commercial timber in Canada, and fifty per cent of this is on Vancouver Island.

Fisheries. The shore line extends nearly 7,000 miles, with a protected territory of nearly 30,000 square miles, abounding with commercial fish. These include salmon, herring, sturgeon, bass, oolachans, smelts, flatfish, black cod, perch, trout, skill, sardines, anchovies, shad, oysters, crabs, shrimps, prawns. The industry is capable of enormous expansion. A large number of fishing interests have combined in the British Columbia Packers' Association, which is heavily capitalized.

Transportation. The rivers, referred to above, were important means of transportation in early days, but the need of railroads was keenly felt. When British Columbia was invited to join the Dominion it pledged itself to do so on the condition that it should be given a railroad to the east across the continent. The mutual pledge was kept by the construction of the Canadian Pacific, which reached the coast at Vancouver in 1885. The Grand Trunk Pacific was the second line to cross the prairies and mountains; its terminus was reached in 1915 at Prince Rupert. The Canadian Northern first operated its lines from Quebec to Vancouver in the same year. There are 2,000 miles of railroad in the province. Most of the interior towns yet depend upon the stage coach for mail and passenger transportation.

Education. The provincial secretary is the minister of education, and the provincial ministry is the council of public instruction. The secretary, with the approval of the council, assumes charge of education. There are normal schools at Victoria and Vancouver; in 1912 the University of British Columbia was founded at Vancouver, and in 1916 its first class was graduated.

Government. The chief executive is the lieutenant-governor, appointed for a five-year term at $9,000 per year by the Governor-General of Canada. Under the latter he is the representative of the Crown. The ministry consists of six members of the legislative assembly, which is a body of forty-two members. The ministers, except the premier, receive $6,000 per year; the premier, $9,000. To the Dominion Parliament British Columbia sends three Senators and eleven members of the House of Commons.

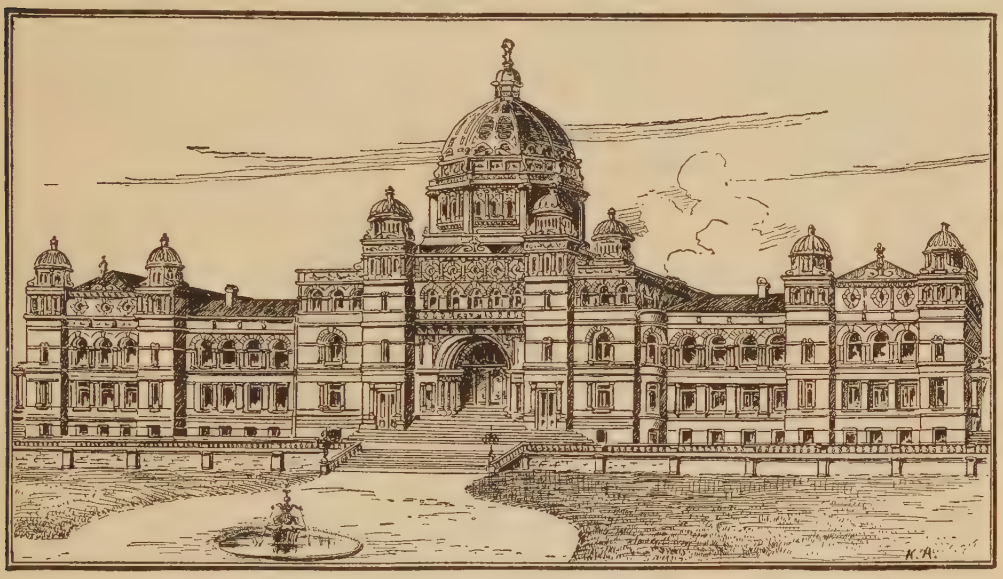
Cities. The chief cities of the province are Victoria, the capital, Vancouver, Nanaimo, Nelson, New Westminster, Prince

Rupert, Esquimalt, Kamloops and Revelstoke.

History. Not until Captain James Cook in 1778 explored this region was anything known of what later became British Columbia. Ten years later at Nootka a number of Englishmen settled, but they were driven away by the Spaniards, who claimed the entire territory as far north as Russian America (Alaska). War between England and Spain was avoided by arbitration, Spain taking the part south of Nootka, including Washington and Oregon, England accepting the strip north to Alaska. Captain George Vancouver in 1792–1794 surveyed the coast for many miles to the north, and as he was the first man to navigate the southwestern island, it was named for him.

The first government was by the Northwest Company, fur traders. In 1821 the Hudson's Bay Company secured all rights and in 1846 built a fort where Victoria now stands. This action aroused the United States, which claimed the territory to 54° 40′ under the Louisiana Purchase (which see). This dispute was likewise submitted to arbitration, and the boundary was fixed where it now stands.

Vancouver Island was made a crown colony in 1859; in the preceding year the mainland, which had been called New Caledonia, was changed to British Columbia. When Confederation was attempted British Columbia would not consider joining the Dominion unless given the promise that it should be connected with the east by a transcontinental railroad. The promise was given but was tardily kept; finally, in 1885, the Canadian Pacific was completed to Vancouver. The early government was autocratic, an inheritance from the Hudson's Bay Company régime, but since 1903 there has been a government fully responsive to public demands. In immigration there has been considerable trouble. Japanese, Chinese and Hindus began flocking to the province in considerable numbers; the latter were denied admission, although a shipload in 1914 attempted to land. Severe restrictions are yet placed upon Chinese immigration.



BRITISH COLUMBIA LEGISLATIVE BUILDINGS

Labor problems have affected the province seriously, but they have been gradually settled. An eight-hour day has been in effect in mines since 1905; two years later the same law was extended to smelters. The Industrial Workers of the World in 1912 attempted to gain a foothold in the province, and although they caused some trouble, they were later eliminated. The most serious labor troubles have been in the importation of Chinese and Italians as strike breakers. In 1916 the province voted full suffrage to women and adopted prohibition. British

Items of Interest on British Columbia

The area of British Columbia is twenty-two times that of Switzerland and more than five times that of the state of Washington.

It is essentially a mountainous region, the two great chains, the Cascade or Coast Range and the Rockies, covering a large part of the area.

Between the two ranges is an elevated tract of hilly country known as the "interior plateau."

Vancouver Island and the Queen Charlotte Islands are remnants of still another range, which ran parallel to the coast, but is now submerged.

The average altitude of the Rockies at the United States boundary is 8,000 feet.

The highest pass over the Rockies is the South Kootenay, or Boundary Pass, 7,100 feet.

The partially submerged valleys of the Coast Range form the many harbors and sounds which are characteristic of the coast. The coast line, including all inlets, is over 7,000 miles long.

On the southwestern side of the Rockies is a great valley in which the Kootenay, Columbia, Fraser, Finlay and other rivers have their upper courses; the northern part of the province is drained by tributaries of the Mackenzie and the Yukon.

In the southern half of the province July is the month of least and December of greatest rainfall.

The mean temperature for the year is about 47° Fahrenheit.

About 340 species of birds are found.

Apples are the principal fruit, but peaches, apricots, almonds, small fruits and grapes are being successfully cultivated.

The Canadian Pacific owns two large lines of steamships running from Victoria and Vancouver.

The province formerly had two colleges, McGill University College of British Columbia at Vancouver, one of the branch colleges of McGill University at Montreal, and Columbia College at New Westminster, affiliated with the University of Toronto. These have been absorbed by the new provincial university at Vancouver.

There are 62 Indian schools, with a total attendance of 2,225.

The population increased from 178,657 in 1901 to 392,480 in 1911, an increase of 119 per cent.

The average density of population, 1.1 per square mile, is less than that of any other province.

A graduated income tax is in force.

Geographical explorations of the Pacific coast began with Cook's voyage in 1778.

Vancouver surveyed almost the entire coast of the present province.

From 1821 to 1849 the country was controlled by the Hudson's Bay Company; it then became a province under royal government.

British Columbia joined the Confederation in 1871, one of the conditions being that the Canadian Pacific should be finished by 1881, but completion was actually postponed until 1885.

Questions on British Columbia

What is the area of British Columbia? How does it compare with Switzerland? With the United Kingdom?

What is the character of the surface?

Name the two great mountain chains and three of the highest mountain peaks.

How was Vancouver Island formed?

How long is the coast line?

What are the common wild animals found in the province?

Which are the principal rivers? In what direction do they flow?

What is the principal industry?

What is the importance of the mining industry in British Columbia as compared with the rest of Canada?

What other minerals are important?

What is the principal product of the fisheries?

How do the fisheries of British Columbia rank?

BRITISH COLUMBIA

1, Apples
2, Unloading Salmon
3, Grapes
4, Lumbering
5, Twin Falls
6, Docks and Harbor of Prince Rupert
7, Smelter

Columbia responded with more than its full quota of men to the Canadian overseas expeditionary forces in the World War, and these troops saw hard fighting.

Related Articles. Consult the following titles for additional information:

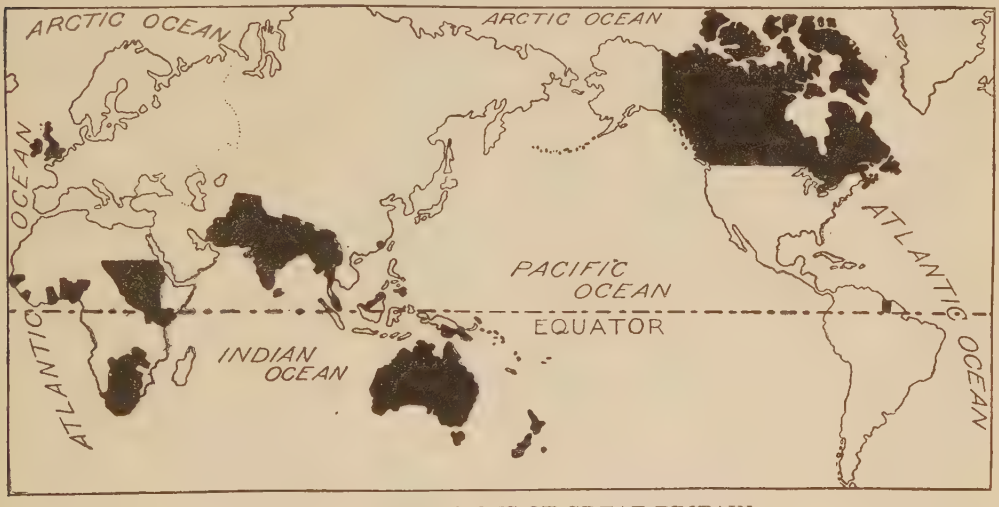
Cascade Range
Columbia River
Esquimalt
Fraser River
Hudson's Bay Company
Juan de Fuca
Kamloops
Kootenay River
Nanaimo
Nelson
New Westminster
Prince Rupert
Revelstoke
Robson, Mount
Rocky Mountains
Saint Elias Mountains
Selkirk Mountains
Vancouver
Vancouver Island
Victoria

BRITISH EAST AFRICA, a term applied to the British possessions in the eastern part of Africa, together with the islands of Zanzibar and Pemba. The mainland possessions include the East African Protectorate and the Uganda Protectorate. See UGANDA; ZANZIBAR; also list of possessions, in BRITISH EMPIRE.

BRITISH EMPIRE, the greatest of modern empires, so extensive that it can be said without exaggeration that there is no time when the sun is not shining on some part of it. The nucleus of this vast empire, which covers almost one-fourth of the land surface of the globe, is the island mass of England, Scotland and Wales, which with Ireland forms the United Kingdom of Great Britain and Ireland. More than 422,000,000 people are under the protection of the British flag, and if the different parts of the empire could be brought together they would form a continent containing about 12,000,000 square miles, or one a little larger than the whole of Africa.

Interest in the British Empire was sharply intensified after the outbreak of the World War, chiefly because the world saw the spectacle of scattered portions of a vast domain magnificently loyal to the home government. Certain discontented elements in South Africa, in India and elsewhere, it is true, tried to cause trouble, but in the main the subjects of the British sovereign the world over gave their treasure and their blood for the preservation of the empire.

The subjects of the British Empire vary from primitive savages to the most advanced peoples of the globe. It is obvious, then, that



PRINCIPAL POSSESSIONS OF GREAT BRITAIN
(In black.)

the methods of controlling and governing the different possessions vary considerably. Many of the African possessions are *protectorates,* with native officials ruling under British advice and protection. Another important class embraces the *colonies.* Canada, Australia and South Africa are examples of *self-governing* colonies, with elected legislative bodies to pass laws pertaining to home affairs. Another kind is the *crown* colony, whose officials are under direct control of the British government. There are, besides, several territories known technically as *dependencies,* and the Empire of India, with various local governments.

The following table gives all the parts of the empire as they existed at the outbreak

of the World War. The population figures in many instances are estimates, as exact statistics cannot always be obtained:

LOCATION	AREA IN SQUARE MILES	POPULATION
In Europe		
England	50,874	34,045,290
Ireland	32,360	4,390,219
Scotland	30,404	4,760,904
Wales	7,466	2,025,202
Isle of Man	227	52,034
Channel Islands	75	96,900
In Asia		
British India	1,093,074	244,267,542
Native States	709,118	70,864,995
Aden and Perim	80	46,165
Sarawak	42,000	500,000
Socatra	1,382	12,000
Straits Settlements	1,630	714,069
Ceylon	25,332	4,106,350
Mauritius and Dependencies	809	365,481
North Borneo	31,106	208,183
Hongkong, including New Territories	390	456,739
Brunei	4,000	30,000
Weihaiwei	285	147,133
Malay Peninsula	52,416	1,936,968
In Africa		
Union of South Africa	473,100	
Cape of Good Hope	276,995	2,564,965
Natal	35,290	1,194,043
Orange Free State	50,389	528,174
Transvaal	110,426	1,686,212
Ascension Island	34	400
Basutoland	11,716	405,600
Bechuanaland Protectorate	275,000	125,350
East Africa Protectorate	246,000	4,038,000
Egypt	350,000	11,189,000
Gambia	4,500	138,401
Gold Coast	80,000	1,503,386
Nigeria	336,000	17,000,000
Northern Rhodesia	290,000	870,000
Southern Rhodesia	148,575	750,000
Nyasaland Protectorate	39,315	1,088,000
Saint Helena	47	3,553
Seychelles	156	24,140
Sierra Leone Protectorate	27,000	1,327,560
Somaliland Protectorate	68,000	300,000
Swaziland	6,536	99,959
Uganda Protectorate	109,119	2,927,500
Zanzibar Protectorate	1,020	197,200
In America		
Canada	3,729,665	7,206,643
Labrador	120,000	3,949
Newfoundland	42,734	238,670
British Guiana	90,500	296,041
British Honduras	8,598	40,458
In Australia		
Commonwealth of Australia	2,974,581	4,455,005
Papua	90,540	400,000
New Zealand	104,356	1,008,468
West Indies		
Bahamas	4,404	55,944
Barbados	166	171,982
Jamaica and Dependencies	4,373	836,998
Trinidad (including Tobago)	1,868	333,552
Leeward Islands	717	127,188
Windward Islands	506	157,264
Scattered Islands		
Fiji	7,435	139,541
Falkland Islands	7,500	3,275
Solomon Islands	14,800	150,500
Bermuda	19	18,994
Gilbert and Ellise Islands	180	31,121
Gibraltar	2	19,586
Tonga Islands	390	21,695
Malta	117	211,564
Cyprus	3,584	273,964
	12,230,457	433,411,624

Related Articles. For descriptions of the various possessions of Great Britain see articles on the more important geographical divisions here listed.

BRITISH GUIANA, from 2° to 7° north of the equator, is the only possession of Great Britain on the South American continent, and one of three of its political divisions that are not independent republics. The other two dependencies are Dutch Guiana and French Guiana. It is located on the Atlantic shore of the continent, and contains 90,277 square miles. Dutch Guiana is east, Brazil is south, and Venezuela and Brazil are west. It is larger than the combined areas of Dutch Guiana and French Guiana. The capital is Georgetown (which see); the population was 309,938 in 1914.

The people, in addition to the white men who conduct the plantations, are largely negroes from the East and West Indies. There are perhaps 15,000 natives who are uncivilized. These live in the unexplored interior, and exist in a condition bordering upon savagery. The soil is the chief source of wealth; it is very rich and produces sugar cane, rice, coffee and sea-island cotton in abundance. Ten million dollars worth of these products are exported every year. The forests are largely unexplored, but they contain many valuable woods. There is some gold, but the mines have been worked but little.

The first Europeans to hold this territory were the Netherlanders, who occupied it in 1613. The English acquired it in 1815 by treaty. (See map, SOUTH AMERICA.)

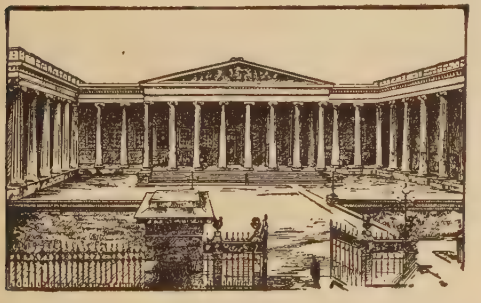
BRITISH HONDURAS, or **BELIZE**, *be leez'*, a crown colony of Great Britain, in the northeastern corner of Central America, with an area of 8,598 square miles and a population of 40,458 in 1911, males and females being almost equal in number. It is the only division of Central America which is not independent. The climate is

hot and moist. Its chief source of wealth is its forests of mahogany and cedar. Besides, there is large production of bananas, cocoanuts, chicle and logwood. The colony is in charge of a governor, who is assisted by an executive council of six members and a legislative council of twelve members.

Spain made early attempts to colonize and control this territory, but in 1783 all disputes were settled by treaty and England's sovereignty was recognized.

BRITISH ISLES, the archipelago off the western coast of Europe, surrounded by the British Channel, the Strait of Dover, the North Sea and the Atlantic Ocean. It includes the island of Great Britain, which is made up of Scotland, England and Wales; Ireland, the Hebrides, the Orkneys and the Channel Islands.

BRITISH MUSEUM, a great national museum in London, which contains many of the world's priceless treasures. It was founded by Sir Hans Sloane, who, in 1753, bequeathed his various collections, including 50,000 books and manuscripts, to the nation, on the condition of $100,000 being paid to his heirs. Montague House was appropriated for the museum, which was first opened on January 15, 1759. The original edifice having become inadequate, a new building in Great Russell Street was resolved upon in 1823, but was not completed till 1847. In 1857 a new library building was completed and opened at a cost of $750,000. It contains a circular reading room 140 feet in diameter, with a dome 106 feet in height.



BRITISH MUSEUM

This room has accommodation for 200 readers comfortably seated at separate desks, which are provided with all necessary conveniences. More recently, the accommodation having become again inadequate, it was resolved to separate the objects belonging to the natural history department from the rest, and to lodge them in a building by themselves. Accordingly, a large natural history museum has been erected at South Kensington, and the specimens pertaining to natural history, including geology and mineralogy, have been transferred thither, but they still form part of the British Museum. Further additions to the Great Russell Street buildings were made in 1882, and again in 1888.

The museum is under the management of forty-eight trustees. It is open daily, free of charge. Admission to the reading room as a regular reader is by ticket, procurable on application to the chief librarian and by complying with certain simple conditions. The library, which is now the second largest and one of the most valuable in the world, has been enriched by numerous bequests and gifts, among others the library collected by George III during his long reign. A copy of every book, pamphlet, newspaper, piece of music, etc., published anywhere in British territory, must be conveyed free of charge to the British Museum.

The museum contains eight principal departments, namely, the department of printed books, maps, charts, plans, etc.; the department of manuscripts; the department of natural history; the department of Oriental antiquities; the department of Greek and Roman antiquities; the department of coins and medals; the department of British and medieval antiquities and ethnography, and the department of prints and drawings. The total number of persons using the reading-rooms each year is about 200,000, and the annual number of visitors, exclusive of readers, is about 700,000. Among the interesting possessions of the museum are the celebrated Elgin Marbles (which see), and the Egyptian Rosetta Stone.

BRITISH NORTH AMERICA ACT, an act passed by the British Parliament in March, 1867, under which the provinces of Canada were organized as the Dominion of Canada. On the following first of July it went into effect. Upper and Lower Canada were divided and named Ontario and Quebec; Nova Scotia and New Brunswick retained their names. Provision was made for the admission of new provinces which might later be formed. See CANADA.

BRITISH SOMALILAND. See SOMALILAND.

BRITISH WEST INDIES, *in'diz*, those islands of the West India group which be-

long to Great Britain. They include the Bahamas, Barbados, Jamaica, the Windward and the Leeward islands, Trinidad, Tobago and a large number of smaller islands. The British West Indies are fertile and productive, producing sugar, fruit, vegetables, cereals, lumber and spices. For the most part they possess attractive scenery, and the tropical climate, modified by the sea breezes, is wholesome for whites and blacks alike. The islands are divided for governing purposes into crown colonies, ruled by governors appointed by the English sovereign, and colonies with a limited degree of self-government. The population of the islands is estimated at about 1,680,650. See WEST INDIES.

BRIT'TANY, or **BRETAGNE**, *bre tahn'y*, a peninsula projecting into the Atlantic Ocean between the British Channel on the north and the Bay of Biscay on the south, and forming the extreme western portion of France. Brittany is a favorite resort of tourists because of its picturesque charm, and the name occurs frequently in song and story. The land is supposed to have taken its name from the ancient Britons, who sought refuge here when driven from the island of Britain. Formerly an independent kingdom, then a duchy of France, it is now a French province, and is subdivided into five departments.

The soil is rather poor, and only meager crops are grown. Of these, corn, grapes and other fruits are the most important. The inhabitants along the coast engage in the manufacture of salt; and coal, lead and iron are found in small quantities in the interior. The fisheries are quite important. Many relics of the early inhabitants are found throughout the country, and the native peasantry retain their ancient language, which closely resembles the Welsh, and their dress and customs. See FRANCE.

BROCADE, *bro kade'*, a form of silk goods enriched with raised flowers, foliage or other ornaments. The term is restricted to silks figured in the loom, distinguished from those which are embroidered after being woven. Brocade was manufactured in Oriental countries at an early date, and in Europe as early as the thirteenth century. At the present time it is utilized as a cloth for expensive upholstering, draperies and royal robes, and is popular for its decorative effects.

BROCK, SIR ISAAC (1769–1812), a British soldier, hero of a battle of the War of 1812. He became lieutenant in 1790, served in the West Indies, in Holland and at the Battle of Copenhagen, and in 1802 went to Canada, where he suppressed a troublesome conspiracy. In 1810 he commanded the troops in Upper Canada and became lieutenant-governor of that province. General Brock moved his command to Detroit in 1812, and in August he captured General Hull with his entire army. Meanwhile, a United States force was gathered on the frontier of Niagara, and in his attack on this force General Brock fell. A magnificent monument in his honor has been erected at the spot where he was killed.

BROCK MONUMENT AT QUEENSTON

BROCKTON, MASS., was founded in 1700 and incorporated in 1821, under the name of North Bridgewater. In 1874 the present name was adopted, and a city charter was granted in 1881. It is the county seat of Plymouth County, twenty miles south of Boston, on the New York, New Haven & Hartford Railroad. Electric lines reach neighboring towns in all directions. Brockton is noted as the leading shoe-manufacturing city of the United States, over 18,000 persons being employed in this industry; the output is over $1,250,000 per week. There are thirty acres of parks, a city hall which cost $1,000,000, a Carnegie Library, three hospitals, a Morris Plan Bank and six other banking institutions. Population, 1910, 56,878; in 1917, 69,152 (Federal estimate).

BROCKVILLE, ONT., the county town of Leeds County, situated on Lake Ontario at the outlet of the Saint Lawrence River, 126 miles southwest of Montreal. The city is served by the Grand Trunk, the Canadian Pacific and the Canadian Northern railways, and is a port of call for Saint Lawrence steamers. Among the products manufac-

tured in Brockville are stoves and hardware, carriages, paper boxes, automobiles, gloves and suspenders, agricultural implements, engines and motor boats. Two lumber companies operate here, and the place is the headquarters of the Eastern Ontario Dairymen's Association. It is visited by tourists and sportsmen who come to enjoy the beautiful scenery and good fishing facilities of the vicinity. Brockville was named in honor of Sir Isaac Brock (which see). Population, 1911, 9,372.

BRODEUR, *bro dure',* LOUIS PHILIPPE (1862–), a Canadian statesman and judge, born at Beloeil, Quebec; educated at St. Hyacinthe College and Laval University. He was admitted to the bar in 1884 and was elected to the House of Commons in 1891. In 1900 he was chosen Speaker of the House but resigned in 1904 to become Minister of Inland Revenue; in 1907 he became Minister of Marine and Fisheries. He accompanied Sir Wilfrid Laurier to England as a delegate to the Colonial Conference of 1907 and was delegate to the Imperial Defence Conference in 1909. With Hon. W. S. Fielding he made the first treaty ever negotiated by a British colony—the French-Canadian treaty of 1907. In 1911 he was appointed justice of the Supreme Court of Canada.

BRO'KER, an agent who is employed to conclude bargains or transact business for others, in consideration of a charge or compensation which is usually in proportion to the extent or value of the transaction completed by him, and is called his *commission* or *brokerage.* In large mercantile communities the business of a broker is usually limited to a particular class of transactions, and each class of brokers has a distinctive name, as *bill broker,* one who buys and sells bills of exchange for others; *insurance broker,* one who negotiates between underwriters and the owners of vessels and shippers of goods; *ship broker,* one who is the agent of owners of vessels in chartering them to merchants or procuring freight for them from one port to another; *stock broker,* the agent of dealers in shares of joint stock companies, government securities and other monetary investments.

A broker differs from a commission merchant in that the latter has temporary possession of the goods which he sells, while the broker does not necessarily handle the goods or stock of his principals.

BROMIDES, *bro'midz,* compounds of bromine with silver, potassium and various other metals. Bromide of potassium, which is like common salt in appearance, is valuable to the photographer because it is employed in the manufacture of silver bromide. The latter is used in preparing films and sensitized plates. Bromide of potassium is prescribed to quiet excited nerves, but is not a safe medicine to use except on the advice of a physician. Other bromides used medicinally include those of ammonium, lithium, calcium and zinc.

BROMINE, *bro'min,* a nonmetallic element discovered in 1826. In its general chemical properties it much resembles chlorine and iodine, and it is usually associated with them. It exists, but in very minute quantities, in sea water, in the ashes of marine plants, in animals and in some salt springs, and is obtained as a by-product of the salt industry. At common temperatures it is a very dark reddish liquid, emiting a red vapor and having a powerful and suffocating odor. It has bleaching powers like chlorine, and it is very poisonous. Its density is about four and a half times that of water.

BRONCHIAL, *bron'ki al,* **TUBES,** a system of small tubes which branch out from the bronchi and penetrate the substance of the lungs. At the extremity of each of these tubes and opening into them are groups of tiny air cells, whose function is to supply the blood with oxygen and take from it carbon dioxide. The distressing cough known as bronchitis is caused by inflammation of the mucous lining of the bronchial tubes.

Related Articles. Consult the following titles for additional information:
Bronchitis Breathing Lungs

BRONCHITIS, *bron ki'tis,* inflammation of the mucous membrane of the bronchial tubes (which see). It is of common occurrence, and may be either acute or chronic. Its symptoms are those of a feverish cold, such as headache, lassitude and an occasional cough, which are succeeded by a more frequent cough, occurring in paroxysms, a sputum of yellowish mucus and a feeling of great oppression on the chest. Slight attacks of acute bronchitis are frequent and not very dangerous. They may be treated with mustard poultices or fomentations, hot baths and laxatives. Acute bronchitis, however, may become a formidable malady and

requires prompt treatment. Its main symptoms are cough, shortness of breath and expectoration. It is particularly liable to attack a person in winter, and in the end it may cause death by preventing the lungs from doing their work and by causing other complications, such as pneumonia.

BRONTE, *bron ta'*, CHARLOTTE (1816–1855), an English novelist of the Victorian Period, whose best-known work, *Jane Eyre*, is considered one of the great novels of English literature. She was one of three talented sisters, daughters of an impoverished clergyman of Haworth, Yorkshire. Under the names of Currer, Ellis and Acton Bell, the three Brontë girls, Charlotte, Emily and Anne, published a volume of poems in 1846, and later each of them wrote a novel. Charlotte found no publishers for *The Professor*, her first attempt, but in 1847 her *Jane Eyre* was a sensational success. It is a stormy, passionate story, reflecting some of her own struggles and experiences. *Shirley* and *Villette*, appearing respectively in 1849 and 1852, are stories of considerable merit, though they lack the power of her greatest work. In 1854 Miss Brontë married her father's curate, the Rev. Arthur Nicholls, but she lived only a few months after her marriage. The story of the Brontë girls, as told by Mrs. Gaskell in her *Life of Charlotte Brontë*, is itself a fascinating tale.

BRONZE, an alloy of copper and tin in varying proportions, with occasionally the addition of small quantities of lead or zinc. The most common varieties of bronze in use are *gun metal*, used in making ordnance (see ARTILLERY; CANNON); *bell metal* (see BELL); *specular metal*, used for making mirrors and reflectors in telescopes; *statuary bronze*, used in sculpture; *aluminum bronze*, a composition of copper and aluminum, closely resembling gold, and *manganese bronze*, often called *white bronze*, a composition of iron and manganese with other bronzes. Gun metal contains nine parts copper and one part zinc. It is very hard and strong. Bell metal for large bells consists of three parts copper to one part tin, and for small bells, four parts copper to one part tin. Statuary bronze contains eight parts copper to two parts tin. Japanese bronzes contain quite a large proportion of lead, which makes them softer. They also contain some nickel, arsenic, silver and gold.

Bronze has been known from a very early period of history. The Chinese and ancient Egyptians were familiar with it centuries before the Christian Era, and it is supposed that their early bronzes were produced by smelting the ores of the metals. Bronze is used for a great variety of purposes in the arts, also for ornamental work, such as railings and other structures. See BRONZE AGE.

BRONZE AGE, a term denoting the period or stage of culture of a people using bronze as the material for implements and weapons. As a stage of culture, the use of bronze comes between the use of stone and the use of iron. The Bronze Age is not an absolute division of time, but a relative condition of culture, which in some places may have been reached early, in others late; in some it may have been prolonged, and in others brief, or even, as in the Polynesian area, it may not have existed, in consequence of the people passing directly from the use of stone to that of iron. The implements and weapons of the Bronze Age include knives, saws, sickles, awls, gouges, hammers, anvils, axes, swords, daggers, spears, arrows, shields. The composition of the bronze varied considerably, but in general it was about ninety per cent of copper to ten per cent of tin. See STONE AGE; IRON AGE.

BROOK FARM, an experiment in coöperative living which at different times had connected with it such distinguished Americans as Nathaniel Hawthorne, George W. Curtis, Charles A. Dana, Margaret Fuller and Ralph Waldo Emerson. Hawthorne's *Blithedale Romance* contains, under the guise of fiction, many of the author's experiences at Brook Farm. It was founded at West Roxbury, Mass., in 1841, under the direction of George Ripley. The industrial system of the community was one of "brotherly coöperation."

All members, regardless of sex, were required to labor a certain period each day, the products being turned in to a common stock, from which all shared practically equally. Financial difficulties, however, soon led to its decline, some of the most distinguished members of the community became discouraged and withdrew, and finally some of its most important buildings were destroyed by fire. The association was dissolved in October, 1847. See COMMUNISM; TRANSCENDENTALISM.

BROOK'LINE, MASS., reputed to be the wealthiest town in the world for its size, is

a residential suburb of Boston, almost surrounded by the greater city, and distant only three miles from the capitol building. It was a part of Boston in 1630, but was separately incorporated in 1705. The Boston & Albany Railroad serves the town, as well as the Boston system of street railways. From Corey Hill there is a fine view of the metropolitan district. Numerous small parks, magnificent residences and landscape effects beautify the town. It is exempt from moving picture theaters. Americans predominate, though Jews are numerous. Population, 1910, 27,792; in 1917, 33,526 (Federal estimate).

BROOKLYN, *brook'lin*, N. Y., until 1898 a separate city of over a million people, but now one of the five boroughs of Greater New York—the Borough of Brooklyn—separated from the island of Manhattan by the East River. It was the largest city in the world ever to become a part of a greater city; at the time of its absorption it was the third largest city in the western world, and could still claim that distinction had it not lost its identity. In 1910 there were 1,634,351 people in the borough.

Brooklyn has not entirely surrendered its individual fame; it is not completely eclipsed by the greater civic unit on Manhattan Island for it is a great manufacturing center, surpassed only by New York interests, Chicago and Philadelphia. The main part of the city, with its great water front, is in sharp contrast with its beautiful eastern section, stretching along Long Island. The latter is a fine residential section.

Four great bridges, the New York subway system and ferry boats connect Brooklyn with Manhattan Island. For details of government, see NEW YORK (City).

BROOKLYN BRIDGE. See BRIDGE, subhead *Suspension Bridges.*

BROOKS, PHILLIPS (1835–1893), an American bishop of the Protestant Episcopal Church, one of the most eloquent pulpit orators of his day. He was born in Boston and educated at Harvard and at a theological seminary in Alexandria, Va. After his ordination as a clergyman Brooks was the rector of the Church of the Advent and later of the Holy Trinity Church, in Philadelphia. In 1869 he became rector of Trinity Church, Boston, remaining there for twenty-two years. In 1891 he was elected bishop of Massachusetts. Brooks was celebrated not only as a popular and powerful preacher, but as a vigorous and independent thinker. Among his publications are *Lectures on Preaching, The Influence of Jesus* and several volumes of sermons. He also is the author of the beautiful Christmas hymn *Oh Little Town of Bethlehem.*

PHILLIPS BROOKS

BROOKS, PRESTON SMITH (1819–1857), an American politician. He became a member of Congress from South Carolina in 1853 and attained an unenviable notoriety in May, 1856, by making a brutal assault upon Charles Sumner in the United States Senate chamber. Brooks resigned his seat, but was immediately reëlected by his constituents.

BROOM CORN, or **BROOM GRASS**, a useful and interesting member of the grass family, so called because it is utilized in making brooms. Though native to the East Indies, it is extensively cultivated in the United States, where the annual yield is nearly 80,000,000 pounds. Oklahoma, Illinois and Kansas produce the largest crops. The standard variety of the plant, which reaches a height of from eight to ten feet or more, bears a pithy stalk and produces long, pointed leaves resembling those of the corn plant. At the top of the stem appears the branching cluster of seed heads. These are harvested before they are ripe, being cut off with six inches of the stalk. After the seed is removed the brush is dried in the shade, and is then sent to factories in bales of about 300 pounds weight. One acre of ground will produce about 500 pounds of brush.

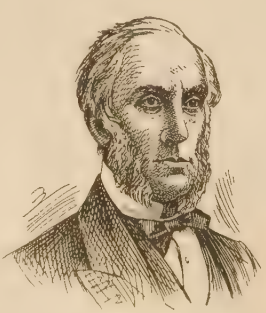
BROTHER JON'ATHAN, a name sometimes used to personify the people of the United States. It is said to have originated during the Revolution in a frequent remark of General Washington concerning Jonathan Trumbull, governor of Connecticut. Trumbull's advice and good judgment were highly valued by Washington, and at critical points the latter was wont to say, "we must ask Brother Jonathan." As the remark passed into current speech the term became broadened in meaning until it included all the people. It differs from *Uncle Sam* in that the latter typifies the government.

BROWN, a color which may be regarded as a mixture of red and black, or of red, black and yellow. There are various brown pigments, mostly of mineral origin, as bistre, umber and cappagh brown.

BROWN, Charles Brockden (1771–1810), the first American novelist of any importance. He was educated for the law, but the term intended for preparatory legal study was principally occupied with literary pursuits. His first novel, *Wieland,* was published in 1798. Others of his works are *Mervyn, Ormund* and *Clara Howard.* Brown's novels, while in certain respects powerful, are of the highly sentimental, improbable type, and their tendency toward the gloomy and horrible has always kept them from becoming popular.

BROWN, Elmer Ellsworth (1861–), and American educator, who for five years held the position of United States Commissioner of Education. He was born in Kiantone, N. Y., and was educated in the Illinois State Normal University, University of Michigan and German universities. After filling several public school positions, Mr. Brown was chosen assistant professor of the science and art of teaching in the University of Michigan in 1891. From there he went to the University of California as associate professor of pedagogy, and in 1893 he was appointed head of the department. In June, 1906, he succeeded William T. Harris as Commissioner of Education for the United States; he resigned in 1911 to become chancellor of New York University. Professor Brown is the author of several books, besides many articles for magazines and reviews.

BROWN, George (1818–1880), a Canadian statesman, born at Edinburgh, Scotland, and educated at Edinburgh High School and at the Southern Academy. He went to New York in 1838 and to Toronto in 1843, where he founded *The Globe,* soon to become one of the leading Canadian papers. In the Canadian legislative assembly to which he was elected in 1851, he became the leader of the radicals. On July 31, 1858, after the defeat of Sir John A. Macdonald, he and Hon. A. A. Dorion formed a ministry but held office for only four days, resigning because the governor-general refused to dissolve Parliament. Brown took a leading part in the effort to secure Confederation, was a member of the Charlottetown and Quebec conferences and president of the Council in the coalition ministry of Sir Etienne Taché. In December, 1873, he was called to the Senate. He declined the lieutenant-governorship of Ontario in 1875 and the decoration of K.C.M.G. in 1879.



GEORGE BROWN

BROWN, John (1810–1882), a Scottish physician and writer, best remembered as the author of a charming story called *Rab and His Friends,* in which the hero is a dog. Brown was educated at the University of Edinburgh. He practiced medicine in Edinburgh and wrote during his leisure hours many essays on medicine, literature and miscellaneous topics. These have been collected in a volume known as *Horae Subsecivae.*

BROWN, John (1800–1859), an American abolitionist, celebrated as the originator of the Harper's Ferry insurrection. He was born in Torrington, Conn. His early years were spent in travels, apparently aimless and valueless, though at times he displayed in his business affairs the real force of his character. He lived at different times in Connecticut, Ohio and New York, was twice married and was the father of twenty children.

JOHN BROWN

In 1855, with four sons, he migrated to Kansas and at once took a prominent position as an anti-slavery man. He became renowned in the fierce border warfare which was carried on for some years in Kansas and Missouri, and he gained particular celebrity by his victories at Pottawatomie and Osawatomie.

About this time he seems to have formed the idea of effecting slave liberation by arming the slaves and inciting them to rise in

revolt against their oppressors. As the first step in this scheme, he designed to seize the arsenal of Harper's Ferry, where an immense stock of arms was kept. On the night of October 10, 1859, he, with a handful of well-armed and resolute companions, including several of his sons, overpowered the small guard and gained possession of the arsenal. During the next morning he made prisoners of some of the chief men of the town, but there was no rising of slaves as he had expected. A squad of United States soldiers under Capt. Robert E. Lee regained control of the arsenal after a short but stubborn fight, in which Brown was severely wounded. On October 27, he was tried at Charlestown for treason and murder, was found guilty and was hanged December 2. His offense was generally condoned in the North, and his execution was condemned. This led the Southerners to become more bitter in their feeling against the antislavery party. The story of John Brown's raid has been kept alive through a song that is still popular—*John Brown's body lies a-mouldering in the grave.*

BROWN, John George (1831–1913), an American painter, born in Durham, England. He studied in Newcastle-on-Tyne and in Edinburgh and in 1853 came to America. He was one of the original members of the Water Color Society and was its president in 1901. Brown is remembered especially for his portrayals of New York bootblacks and street urchins. Among his productions are *Hiding in the Old Oak, Pull for the Shore* and *Street Boys at Play.*

BROWNE, Charles Farrar (1834–1867), an American humorist, best known as "Artemus Ward." Originally a printer, he became editor of papers in Ohio, where his humorous letters became very popular. He subsequently lectured in California and Utah and in England, where he also contributed to *Punch.* His writings consist of letters and papers by Artemus Ward, a pretended exhibitor of wax figures and wild beasts, and are full of drollery and eccentricity.

BROWNIE, in the superstitious lore of Scotland, an imaginary spirit formerly believed to haunt houses, particularly farmhouses. He was believed to be very useful to the family, particularly to the servants, for whom he was wont to do many pieces of drudgery while they slept. The brownies bear a close resemblance to the Robin Goodfellow of England and to the Kobold of Germany. The *Brownie Books* of Palmer Cox, an American artist, are excellent modern stories based on these interesting little creatures.

BROWNING, Elizabeth Barrett (1806–1861), the most famous woman poet England has ever produced. She grew up at Hope End, near Ledbury, Herefordshire, where her father possessed a large estate. She was always extremely delicate, as she had been injured by a fall from her pony when a girl, but her mind was sound and vigorous and was disciplined by a course of severe and exalted study. She early began to commit her thoughts to writing, and in 1826 she published anonymously a volume entitled *An Essay on Mind, with Other Poems.* In 1840 she received a severe shock from the drowning of her brother, and for a time her life was despaired of. Several years were spent in the confinement of a sick-room, but she was far from idle during this time, and some of her best-known poems, among them *The Cry of the Children* and *Lady Geraldine's Courtship,* appeared in 1844.

MRS. BROWNING

This last poem contained a compliment to Robert Browning, who called to thank her. Their acquaintance grew into a mutual love, and in 1846 they were married, greatly against the wishes of her father. It proved an unusually happy union. From the time of their marriage until Mrs. Browning's death, the poets lived in Italy, and here Mrs. Browning's health improved. She died in the Casa Guidi, at Florence, a city very dear to her, as she had wished.

The *Prometheus Bound* (from the Greek of Aeschylus) and *Miscellaneous Poems* appeared in 1833; the *Seraphim and Other Poems* in 1838; *Casa Guidi Windows,* a poem on the struggles of the Italians for liberty in 1848–1849, was published in 1851, and the longest and most finished of all her works, *Aurora Leigh,* a narrative and didactic poem in nine books, was published six years later. Two posthumous volumes, *Last Poems* and *The Greek Christian Poets and the English Poets* (prose essays and transla-

tions), were edited by her husband. Her *Sonnets from the Portuguese,* written during her engagement to Browning and not shown even to him until after their marriage, bear comparison with the finest sonnets in the English language and perhaps surpass all other love sonnets. The title *From the Portuguese* was given them simply as a disguise. (See article below.)

BROWNING, ROBERT (1812–1889), one of the great poets of the Victorian era, the exponent of a sound, healthful optimism. Browning's poetry is famed for thought; he appeals to those who regard vigor and strength in poetry of greater worth than lyric beauty. At times, however, this poet wrote lines as musical as any that ever have been penned. Browning's education was received neither in a large school nor in a college, but from private tutors and from travel on the Continent. He wrote poetry while he was but a boy, and when the poems of Shelley and Keats came into his hands they confirmed him in his desire to be a poet, although they made him look with disfavor on his own early attempts. His first published works met with little general success, although they were praised by the critics.

ROBERT BROWNING

In 1844 Browning became acquainted with Elizabeth Barrett, through calling on her to thank her for a compliment which she had paid him in one of her poems. The acquaintance grew into love, and they were married in 1846. Their life together was very beautiful, and her death in 1861 was a shock from which Browning never completely recovered. He removed from Italy, where all of his married life had been spent, to England, that he might educate his son; there he was very popular socially. He returned, however, to Italy later, where he died.

Browning was a most productive writer. From the time that his first poem, *Pauline,* appeared, in 1832, until his death he wrote rapidly, revising little. This unwillingness to revise, which amounted practically to an inability, prevented Browning from attaining the faultless form which distinguished Tennyson's works. One thinks in reading Browning, less of the form than of the substance, and he is considered preëminent as a poet-thinker. The study of the human soul had for him the greatest fascination, and he was able to analyze it and to describe its experiences as perhaps no other English poet except Shakespeare has ever been able to do. His genius was distinctly dramatic, and had he lived in an age when the drama was the chief form of literary expression, he might have done his greatest work in that field. It is, however, in the dramatic monologue that he excelled. Such poems as *My Last Duchess, Andrea del Sarto* (see PAINTING for an extract from this poem), *The Bishop Orders His Tomb at Saint Praxed's Church, Fra Lippo Lippi, A Forgiveness,* are fine examples of his success. *The Ring and the Book,* considered by most critics Browning's masterpiece, is a long poem made up of a series of monologues. The story is told simply in the first book, and in each of the remaining ones the view of some one speaker or class is expressed, and Browning is thus enabled to give some of his most subtle pictures of character.

Besides the poems mentioned above, his best-known works are the dramas *Strafford, A Blot on the 'Scutcheon, Colombe's Birthday, In a Balcony, Pippa Passes, Paracelsus, Saul, Rabbi Ben Ezra* and the poems comprised in the collection known as *Men and Women.*

Browning's characteristic optimism is well expressed in the following lines, in which he describes himself as—

> One who never doubted clouds would break,
> Never dreamed, though right were worsted, wrong would triumph;
> Held, we fall to rise, are baffled to fight better,
> Sleep to wake.

BROWNING MACHINE GUN. See MACHINE GUN.

BROWNSVILLE, TEX., settled in 1848 and incorporated in 1853, is the county seat of Cameron County, the most southerly town in the state, on the Rio Grande River, about fifteen miles from the Gulf of Mexico and opposite Matamoros, Mexico. It is 372 miles southwest of Galveston, and is on the Saint Louis, Brownsville & Mexico Railroad. The river is not navigable. There is a Roman Catholic college, a convent and a cathedral, a custom house, hospital, a library and a country club. Mexican exports and imports in large quantities pass through the city. Population, 1910, 10,517; in 1917, 13,590 (Federal estimate).

BROWN-TAIL MOTH, a European moth very destructive to orchard, forest and shade trees, introduced into New England about 1890. The female deposits her eggs on the under side of a leaf during the first three weeks in July; they hatch fifteen or twenty days later. The young larvae begin feeding on the outer coat of the leaf and when full-grown, spin a cocoon of grayish silk. The caterpillars pupate within their cocoons at the tips of twigs the latter part of June, and the moths emerge about the middle of July. On mornings during the flying season hundreds of the moths can be seen collected on lamp poles. The wings are pure white, the name brown-tail being given the moth on account of a bunch of brown hair at the tip of the abdomen of the female. The wing expanse of the female is about one and one-half inches, the male being slightly smaller. The destructive work is done by the caterpillars, whose winter webs can be seen at the tips of twigs from October to April.

Webs should be removed and burned, as web destruction is by far the best means of exterminating the moth. Spraying with kerosene emulsion or strong soap suds destroys the caterpillars (see INSECTICIDES). See also, GYPSY MOTH.

BROWN THRASH'ER, often incorrectly called a brown thrush, a large, handsome, reddish-brown bird, common in the Eastern United States, where it is considered one of the finest native songsters, not much inferior to the mocking bird. It is a good mimic, and in the early morning or evening time it perches in the top of a tree and sings sometimes for an hour or more. It nests in shrubbery and brush piles, laying four or five bluish-white eggs, spotted with reddish-brown. The brown thrasher is an industrious enemy of harmful insects.

BROWN UNIVERSITY, an educational institution in Providence, R. I., established in 1764 by an act of the general assembly of the state, under the name of Rhode Island College. It is thus one of the oldest American institutions of higher education. The college was founded at the request of the Baptists, under whose auspices the institution has always continued, although it is nonsectarian in spirit. In 1804 the name was changed to Brown University, in honor of Mr. Nicholas Brown, who had bequeathed the institution a large sum of money. In 1891 a woman's college was established, now known as the Woman's College in Brown University. The institution has about 100 professors and instructors, nearly 1,000 students, and an endowment fund of over $4,250,000. The library contains 235,000 volumes.

BRUCE, ROBERT (1274–1329), the most heroic of Scottish kings. In 1296, as Earl of Carrick, he swore fealty to Edward I, and in the following year he fought on the English side against Wallace. He then joined for a time the Scottish army, returned again to his allegiance to Edward, and in 1299 he was appointed one of the four regents of the kingdom. In the three final campaigns he managed to keep up friendly relations with Edward and resided for some time at his court. In 1306, in a violent quarrel with Comyn, a claimant to the Scottish throne, he stabbed his adversary. He then assembled his vassals and claimed the crown, which he received at Scone. After being twice defeated, he dismissed his troops, retired to the Irish coast and was supposed to be dead; but in the spring of 1307 he landed on the Carrick coast, defeated the Earl of Pembroke at Loudon Hill and in two years had wrested nearly all of Scotland from the English. He then advanced into England, laying waste the country; and in 1314 he defeated at Bannockburn (which see) the English forces advancing under Edward II to the relief of the garrison at Stirling.

In 1316 he went to Ireland to the aid of his brother Edward, and on his return in 1318, in retaliation for inroads made during his absence, took Berwick and harried Northumberland and Yorkshire. Hostilities continued until the defeat of Edward near Biland Abbey in 1323, and though in that year a truce was concluded for thirteen years it was speedily broken. Not until 1328 was the treaty concluded by which the independence of Scotland was fully recognized. Bruce did not long survive the completion of his work, but died at Cardross Castle in 1329.

BRUGES, *broozh*, BELGIUM, an old walled city, capital of the province of West Flanders. Its name, which means *bridges*, refers to the numerous bridges that cross the many canals intersecting the city. Bruges lies fifty-five miles northwest of Brussels, on the railway to Ostend. It is noted for the architectural beauty of its buildings, which includes the Market Hall, with a tower 354 feet high,

in which is a fine set of chimes; the Hotel de Ville; the Bourse; the Palace of Justice, and the Church of Nôtre Dame, with its elevated spire and splendid tombs of Charles the Bold and Mary of Burgundy. The principal canals are those to Sluis, Ghent and Ostend, on all of which large vessels can come up to Bruges.

At the outbreak of the World War the place was a thriving center of lace and textile manufacture, and it also possessed tobacco factories, breweries and shipbuilding yards. Though occupied by the Germans early in the war, it was not seriously damaged. It was recaptured by the allies in October, 1918. Population, 1910, 53,635.

BRUMMELL, George Bryan (1778–1840), an English man of fashion, called Beau Brummell because of his fastidious taste in dress. He was educated at Eton and at Oxford, and at the age of sixteen he made the acquaintance of the Prince of Wales, afterward George IV, who made him a cornet in his own regiment of the Tenth Hussars and secured his rapid promotion. Inheriting a large fortune from his father, Brummell lived extravagantly for twenty-one years, but later fell into misfortune and died miserably in an asylum for the poor.

BRUNELLESCHI, *broo nel les'ke,* Filippo (1377–1446), an Italian architect, born in Florence. When at Rome with Donatello he conceived the idea of bringing architecture back from the Gothic style to the principles of Greece and Rome. In this he was successful, as his work opened the way for Bramante and others, and made him the real founder of Renaissance architecture. He himself, however, did not depart entirely from the medieval art, as was shown by his design for the façade of the Church of Santa Maria Novella. In 1417 he removed to Florence, where he lived the rest of his life. His great achievement was the dome of the Cathedral of Santa Maria at Florence, the possibility of erecting which was denied by other architects. It has remained, however, unsurpassed, for the dome of Saint Peter's, though excelling in height, is inferior to it in massiveness of effect. He also designed the Pitti Palace at Florence and the Pazzi Chapel at Santa Croce.

BRUNHILDE, *broon hil'da.* See Nibelungenlied; Sigurd.

BRUNN, *brün,* Austria, capital of the former Austrian province of Moravia, is situated on the railway from Vienna to Prague, eighty-nine miles north of Vienna. The city has an attractive location at the junction of the rivers Schwarzawa and Zwittawa. It contains a cathedal and other handsome churches, several palaces, a barracks and a new theater. Brünn has extensive manufactures of woolens, which have procured for it the name of the *Austrian Leeds.* There are other manufactures of leather, machinery, chemicals and beer. It is the center of Moravian commerce, a great part of which is carried on by fairs. Brünn dates back to the ninth century, though the new town was not founded until 500 years later. In 1918 Moravia joined with Bohemia, Silesia and Slovakia to form the Czecho-Slovak Republic (which see). Of this new state Brünn will be an important city. Population, 1910, 125,737; in 1914, estimated, 131,800.

BRUNSWICK, *brunz'wik,* the largest of the five duchies of the former German Empire, and the one from which came the ducal family whose descendants now rule in Great Britain (see Brunswick, Family of). Brunswick is situated in the north-central part of Germany, and is surrounded by the Prussian provinces of Hanover, Saxony and Westphalia. With an area of 1,418 square miles, it is 170 square miles larger than Rhode Island.

The northern portion is hilly, or undulating. The southeastern part contains a portion of the Harz mountain system and rises in some places to an altitude of more than 3,000 feet. Deposits of iron ore, lead, copper and brown coal are found, and mining is an industry of some importance. About one-half of the land is capable of tillage, and the leading crops are grain, potatoes, flax, sugar beets and fruit. The manufacturing industries include brewing, distilling and the manufacture of linens, woolens, leather, paper, tobacco, soap and beet sugar.

Brunswick formerly sent two members to the Bundesrat and three deputies to the Reichstag. It was locally governed by an hereditary ruler, and had its own constitution and legislative body. The last duke, Ernst Augustus, abdicated on November 12, 1918, during the revolution that overthrew the empire (see Germany). Population, 1910, 494,339.

BRUNSWICK, Family of, a distinguished family founded by Albert Azo II,

Marquis of Reggio and Modena, a descendant, by the female line, of Charlemagne. Albert's son Guelph, who was created Duke of Bavaria in 1071, married Judith of Flanders, a descendant of Alfred of England, and from them descended Henry the Lion, who succeeded in 1125 to the control of the duchy and by marriage acquired Brunswick and Saxony. Otho, the great-grandson of Henry, by a younger branch of his family, was the first who bore the title of Duke of Brunswick (1235). By the two sons of Ernst the Confessor, who became duke in 1532, the family was divided into the two branches of Brunswick-Wolfenbüttel and Brunswick-Lüneburg (House of Hanover), from the latter of which comes the present royal family of Britain.

BRUNSWICK, GA., founded in 1760 and named for the Duke of Brunswick, is the county seat of Glynn County, and is ninety miles south of Savannah and eight miles from the ocean, on Oglethorpe Bay. The city has the Atlantic Coast Line, the Southern, the Atlanta, Birmingham & Atlantic and the Georgia Coast & Piedmont railroads. There are large packing and canning industries and manufactures of rosin and turpentine. A Federal building which cost $50,000 was erected in 1902; there is a city library and a hospital. The population, largely American, was 10,182 in 1910; in 1917, 10,984 (Federal estimate).

BRUNSWICK, GERMANY, capital of the duchy of the same name, is situated on the Oder River, thirty-five miles southeast of Hanover, and is on the railway from Hanover to Berlin. The streets of the older part of the city are narrow and winding and have all the characteristics of the cities of the Middle Ages. The most important public buildings are the ducal palace; the Cathedral of Saint Blaise, erected in 1173; Saint Catherine's Church, 1172, and Saint Magnus's Church, 1031; the Gewandhaus, and the old Gothic Council House. The educational institutions include a polytechnic school, a gymnasium and the Collegium Carolinum, an institution in grade between the common school and the university. The city also has a city museum and a public library. The leading industries are manufactures of woolens, linen goods, jute, machinery and chemical products. The city owns its gas plant and waterworks, slaughter houses and markets; it also has an excellent sewage system. It is an important railway center and carries on a good trade in home products, grains and manufactures. Population, 1910, 143,552.

BRUNSWICK BLACK, a varnish composed chiefly of lampblack and turpentine, and applied to cast-iron goods to give them a glossy black and enamel-like surface. Asphalt and oil of turpentine are also ingredients in some varieties.

BRUSA, or **BROUSSA,** *broo'sah,* in ancient times called PRUSA, is a Turkish city in Asia Minor, about twenty miles south of Mudania, its port on the Sea of Marmora. The city has a picturesque situation at the foot of the ridges of Olympus, and is traversed by several branches of a mountain stream. Many ancient mosques, some in ruins because of earthquakes, and an old castle in the center of the place give it an Oriental charm, while its well-stocked bazars and manufactories of carpets and silks testify to its industrial importance. In the vicinity there are a number of tombs of Turkish royalty, and a mile west of the city there are four sulphur springs, which are visited for their medicinal qualities. Brusa is connected with its port by railway. Population, estimated, 90,000.

BRUSH, an article made of bristles, fibers or wire, set in a back and used for smoothing, cleaning and other purposes. Brushes are of two classes, those having stiff fiber and those with flexible fiber. The stiff brushes are made of hog's bristles, whalebone, palm fibers and occasionally of wire. The flexible brushes are made of fine bristles and the hair from certain animals, such as the camel, badger, squirrel, sable and goat. These are chiefly used for painting, and the smallest kind are called *pencils.* Brushes having more than one tuft of fiber are made by fastening the tufts into holes in the back, by means of a wire. When the tufts have all been fastened, a piece of finished wood or other substance is glued upon the back, and then the tufts are cut the same length.

BRUSH, CHARLES FRANCIS (1849–), an American electrician, famed as the inventor of the Brush dynamo for arc lighting, and of an electric lamp, as well as of a large number of devices which have been of great use in the development of the electric light. He was born in Euclid, Ohio, and educated at the University of Michigan. Brush is a member of numerous learned societies and

has been elected to the French Legion of Honor. See ELECTRIC LIGHT.

BRUSSELS, BELGIUM, the capital of the kingdom and of the province of Brabant. This beautiful city shared the tragic fate of nearly all of Belgium when, in September, 1914, it was occupied by the invading Germans. Its defenders, however, surrendered the city peaceably because they wished to save it from bombardment (see WORLD WAR). Brussels lies in the central part of Belgium, twenty-seven miles south of Antwerp. The city consists of a lower town and an upper town. The older or lower part is surrounded with fine boulevards, on the site of its fortifications, and is devoted almost entirely to commerce and industry. The upper town, which is partly inside the boulevards and partly outside, is the finest part of the city, and contains the king's palace, the government offices and the finest streets and hotels. Among the important buildings is the Hôtel de Ville, a part of which dates from the fifteenth century. It is an imposing Gothic structure, with a spire 364 feet in height, the square in front of it being perhaps the most beautiful of all the public places of Brussels. The Cathedral of Saint Gudule, begun about 1220, the finest of many fine churches, richly adorned with sculptures and paintings; the royal palace; the Palace of the Nation, and the Palace of Justice are other notable structures.

The institutions comprise a university, an academy of science and the fine arts and polytechnic school; one of the finest observatories in Europe; a conservatory of music; a public library containing 400,000 volumes; a picture gallery, with the finest specimens of Flemish art, and many learned societies and educational organizations. The manufactures and trade are greatly promoted by canal communications with Charleroi, Mechlin, Antwerp and the ocean, and by the network of Belgian railways. The industries are varied and important. Lace, an ancient manufacture, is still of great importance, and the manufacture of cotton and woolen fabrics, paper, carriages and many minor products is carried on. There are breweries, distilleries, sugar refineries and foundries.

During the Middle Ages Brussels did not attain great importance. It was fortified with walls by Baldric of Louvain in 1044, and in 1430, when Brabant passed into the hands of the Dukes of Burgundy, was a prosperous city. It became the seat of government during the rule of the Hapsburgs, early in the sixteenth century. Bombarded and burned by the French in 1695, it was again taken by the French in 1794 and was retained till 1814. From 1815 to 1830 it was one of the capitals of the Kingdom of the Netherlands, and in 1830 it was the center of the revolt which separated Belgium from Holland. In 1918 Brussels was evacuated by the Germans in compliance with the terms of the armistice. Rioting and street fighting were reported as incidents of the evacuation. Population, 1912, 663,647.

BRUSSELS SPROUTS, one of the cultivated varieties of cabbage. The plant has an elongated stem four or five feet high, and bears small, clustering green heads like minature cabbages. The heads are gathered in the autumn and are cooked in about the same way as cauliflower. The plant had its origin in Belgium.

BRUTUS, DECIMUS JUNIUS (84–43 B. C.), a Roman soldier who served under Julius Caesar, in Gaul, was afterward commander of his fleet and was even chosen as Caesar's heir in the event of the death of Octavius. Despite this, however, he joined in the assassination of Caesar. He was afterward for a short time successful in opposing Antony, but he was deserted by his soldiers in Gaul and betrayed into the hands of his opponent, who put him to death.

BRUTUS, MARCUS JUNIUS (85–42 B. C.), a distinguished Roman, one of the leaders in the conspiracy to assassinate Caesar. He was at first an enemy of Pompey, but joined him on the outbreak of civil war and remained with him until the Battle of Pharsalia. He then surrendered to Caesar, who made him in the following year governor of Cisalpine Gaul, and afterward of Macedonia. He soon, however, joined the conspiracy against Caesar, and by his influence insured its success (see CAESAR, CAIUS JULIUS). After the assassination Brutus took refuge in the East, made himself master of Greece and Macedonia and with a powerful army joined Cassius in the subjugation of the Lycians and Rhodians. In the meantime the triumvirs, Octavianus, Antony and Lepidus, had been successful at Rome, and were prepared to encounter the army of the conspirators, which, crossing the Hellespont, assembled at Philippi in Macedonia. Cassius appears to have been

beaten at once by Antony; and Brutus, though temporarily successful against Octavianus, was totally defeated twenty days later. He escaped with a few friends; but, seeing that his cause was hopelessly ruined, he fell upon the sword held for him by his friend Strabo, and died. A sympathetic view of Brutus is given in Shakespeare's *Julius Caesar,* in which he is the real hero.

BRYAN, WILLIAM JENNINGS (1860–), an American lawyer, orator, journalist and politician, who became one of the most influential leaders of the Democratic party of his time. He was three times defeated for the Presidency, but he never lost the regard of a very large number of followers. Bryan was born in Salem, Ill. He attended the public schools in his native village and completed his education at Whipple Academy and at Illinois College, Jacksonville, Ill. He then entered the Union College of Law at Chicago, graduating in 1883, and began the practice of his profession at Jacksonville. In the following year he was married to Miss Mary Baird, who, having also received a legal education, was thereafter his valued adviser in both business and politics. In 1887 he removed to Lincoln, Neb., where he continued to practice law and also entered politics, affiliating with the Democratic party. Bryan soon attracted public notice by his eloquent advocacy of free trade. By a vigorous personal canvass he was chosen to Congress from a Republican district by a huge majority, and for two terms was a conspicuous member of that body. During this service he heightened his reputation as a political orator by several notable speeches in favor of free trade. In 1893 he was Democratic candidate for the United States Senate, but was defeated. He then became editor of the *Omaha World-Herald,* but after a short time returned to his law practice.

WILLIAM J. BRYAN

Bryan had severely criticised the Cleveland administration for its attitude upon the money question, and at the Democratic national convention in Chicago in 1896, by a remarkable speech urging the adoption of the policy of free coinage of silver at the ratio of sixteen to one, he captured the nomination for the Presidency. His candidacy was endorsed by the Populist and Silver Republican parties. Then followed one of the most noteworthy campaigns in American history, during which Bryan traveled more than 18,000 miles and made hundreds of addresses. He was defeated, however, by William McKinley, the Republican candidate. At the outbreak of the Spanish-American War he organized a volunteer regiment and became its colonel. In 1900 he was again nominated for President by the Democrats, but was again defeated by McKinley. After his second defeat he founded a weekly paper called *The Commoner,* later changed to a monthly. In 1906 he made a tour around the world, which he described in a series of letters to several American newspapers.

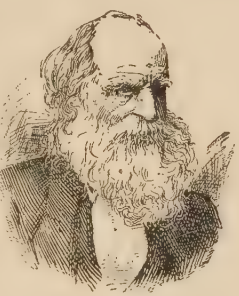
His Later Career. After the disastrous defeat of the Democrats in 1904, it was felt that the strongest candidate possible should be chosen to represent the party in 1908. Bryan had been little heard of in politics for the first two years after 1904, but as the next campaign approached he was looked upon as the only man who could defeat the Republicans. Thus for the third time he ran for the Presidential office, but was decisively defeated by William H. Taft. Even this defeat failed to shake his influence among the liberal Democrats, and in 1912 at the Baltimore convention he was the dominating personality. The nomination of Woodrow Wilson was without question due to his decisive stand for that distinguished candidate, a fact recognized by Wilson when he formed his cabinet, in which Bryan held the office of Secretary of State.

It must be acknowledged, however, that Bryan did not achieve pronounced success in this position. He held the office at a time when the government was forced to meet very complicated international questions growing out of the World War, and it soon became apparent that the decision on all important points was always left to the President. In June, 1915, he tendered his resignation because he disagreed with the President's handling of certain complications arising from the war, particularly those pertaining to Germany's submarine activities.

Though Bryan was an outspoken pacifist, he immediately gave his full support to the administration as soon as America entered

the war, and his striking talents as an orator were used generously in upholding the President. He was also especially interested in the Prohibition cause, for it had received his support for many years. With voice and pen he worked zealously to make the nation "dry," and he was considered the country's most effective speaker for the Prohibition movement.

BRYANT, WILLIAM CULLEN (1794–1878), an American poet and journalist, the first great poet of the United States. Because of this fact he is often called the "father of American poets." Bryant was born at Cummington, Mass., November 3, 1794. When but ten years old he contributed his first poem to a country newspaper, and at fourteen he published *The Embargo,* a satirical poem about the Embargo Act which had recently been passed. It was probably in his seventeenth year that Bryant wrote *Thanatopsis,* which in 1817 was published in the *North American Review.* During Bryant's absence from home this poem was accidentally discovered by his father, who took it to Boston and showed it to several men prominent in literature. Their high recommendation led to its publication in the *Review.* Before he was twenty-one Bryant had also written *To a Yellow Violet, Inscription for the Entrance to a Wood, To a Waterfowl* and other poems of less merit. He became a frequent contributor to the *North American Review,* most of his articles consisting of literary criticism. In 1821 he was invited to deliver a poem before the Phi Beta Kappa society of Harvard, and for the occasion he wrote *The Ages,* which, with several other poems, was published in 1825. In the same year he removed to New York and became associate editor of the *New York Evening Post,* of which, three years later, he became editor in chief. He retained this position until his death, which occurred from sunstroke June 12, 1878.



WILLIAM CULLEN BRYANT

Bryant's place in American literature is unique; his career as author and journalist covered two-thirds of a century and he was the leading American writer of verse until the rise of Longfellow. During the long period of his active life he retained to their fullest capacity his superb intellectual powers. He never ceased to be progressive and productive. Stoddard says of him: "He enjoyed the dangerous distinction of proving himself a great poet at an early age; he preserved this distinction to the last for the sixty-four years which elapsed between the writing of *Thanatopsis* and the *Flood of Years* witnessed no decay in his poetic capacities, but rather the growth and development of trains of thought and forms of verse of which there was no evidence in his early writings."

Bryant was the poet of nature, but few of his poems are without the note of moralizing. Nearly all are short, and many of them are so well known as to be almost household words. Besides those already mentioned, may be cited *To the Fringed Gentian, The Death of the Flowers, The Crowded Street, My Country's Call* and *The Battlefield,* as among his popular poems. He also translated the *Iliad* and the *Odyssey* and published *Letters of a Traveler; Letters from the East; Letters from Spain and Other Countries,* and *Orations and Addresses.*

While Bryant will always be remembered as a poet, he attained as an editor a distinction won by few. For fifty years he was associated with, and during most of the period was proprietor of, one of the leading journals of the country. His editorials were plain, direct, straightforward and convincing. An uncompromising abolitionist, he dealt telling blows against slavery through his editorials. His long service as a writer on public affairs were influential, and he lived to see many of the reforms which he advocated become firmly established.

Other interesting facts about Bryant may be found in the article Reading.

BRYCE, GEORGE, REV. (1844–), a Canadian clergyman and author, born at Brantford, Ontario; educated at Brantford High School, University of Toronto and Knox College, Toronto. Dr. Bryce played an important part in the development of Manitoba; he was selected by the General Assembly of the Presbyterian Church to organize a church and college at Winnipeg in 1871. He was one of the founders, councillor and examiner of the University of Manitoba; he was also head of the faculty of science and lecturer in biology and geology. He was

senior professor and financial agent of Manitoba College, also professor of English. He is the author of many articles and books on Canadian history; among the best known are *Manitoba: Infancy, Progress and Present Condition; Short History of the Canadian People,* and *Remarkable History of the Hudson's Bay Company.*

BRYCE, *brise,* JAMES VISCOUNT (1838–), an eminent British historian, diplomat and legislator, who has done much to create a friendly understanding between his own country and the United States. He is known especially as the author of *The American Commonwealth,* the best interpretation of American political institutions ever written. Bryce was born at Belfast and educated at the University of Glasgow and at Oxford. At the age of twenty-six he published *The Holy Roman Empire,* a book that gave him international fame as an historian.

He was admitted to the bar in 1867 and three years later he was made regius professor of civil law at Oxford, a position he held for twenty-three years. From 1885 to 1906 he was a member of Parliament. While serving in Parliament he was an inspiring leader in the cause of national education in England, and was chairman of the Royal Commission on Secondary Education in 1894. From the first he was a Liberal in politics and a strong advocate of Home Rule for Ireland, and was chief secretary for Ireland in 1905. From 1906 to 1913 Bryce served as ambassador of Great Britain to the United States with high distinction, and in 1914 he was raised to the peerage. In 1915 he headed a commission of eminent jurists who made a report on German atrocities in Belgium.

BRYN MAWR, *mar,* **COLLEGE,** an institution for the higher education of women, located at Bryn Mawr, Pa., and founded in 1880 by Joseph W. Taylor, who was a member of the Society of Friends. The college is characterized by its high requirements for admission and the general culture and high scholarship of its students. It maintains a faculty of sixty members and has about 450 students. The library contains 75,000 volumes.

BRYOPHYTES, *bri'o fites,* members of one of the four orders into which the nonflowering plants are divided. The two great classes of bryophytes are the liverworts and mosses. None of the plants has true roots, but all develop other organs which perform the same work as roots. Some have leaves, but others are leafless. See MOSSES; BOTANY.

BUBAS'TIS, an ancient Egyptian goddess symbolizing joy and mirth, whose seat was in a town of the same name. In some respects she was similar to Artemis of Greek mythology, though the connection has never been fully accepted by scholars. Her sacred animal was the cat, and she appears on monuments as a cat or a woman with a cat's head, though occasionally represented as a lion-headed goddess.

BUBON'IC PLAGUE. See PLAGUE.

BUCCANEERS, *buk a neerz'* the name given to a class of adventurers who in the sixteenth and seventeenth centuries infested the Caribbean Sea and neighboring coasts and preyed upon commerce. Famous among them were the Elizabethan seamen, including Drake and Hawkins, who operated against Spain with the consent and assistance of the British government, on account of the religious wars between the two countries. In the eighteenth century, as the codes of international law became more settled and embodied more advanced ideas, buccaneers or freebooters were compelled to adopt the methods of pirates, or outlaws, among whom Captain Kidd was perhaps the most famous. The next development was the practice of marooning, that is, putting those whom they had robbed ashore on desert islands. By the end of the eighteenth century, all of these practices had practically been abandoned.

The name *buccaneer* has an interesting origin. It is derived from the French *boucan,* which means *place for curing meat,* and was applied because the first buccaneers stole cattle and sold to seamen the meat which they cured. In course of time they stole the vessels of the seamen and took to the sea themselves.

BUCENTAUR, *bu sen'tawr,* a mythical monster, half man and half ox. The name Bucentaur was also given to the splendid galley in which the doge of Venice annually wedded the city and the Adriatic by dropping a ring into the water.

BUCEPHALUS, *busef'a lus,* the favorite horse of Alexander the Great, which, according to legend, Alexander himself broke in. The horse died during Alexander's expedition to India, and Alexander built near its grave a city called Bucephalia.

Buchanan's Administration

1857

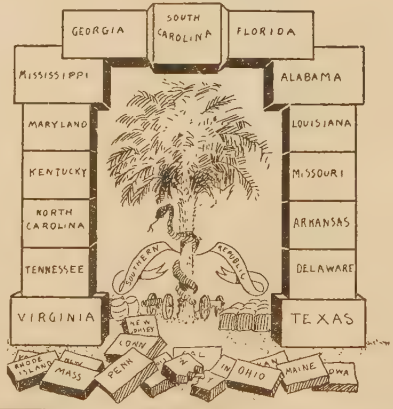
1861

MINNESOTA BECOMES A STATE – 1858 –

OREGON ADMITTED TO THE UNION – 1859 –

KANSAS ADMITTED AS A STATE – 1860 –

CONFEDERATE STATES ORGANIZED IN 1861–



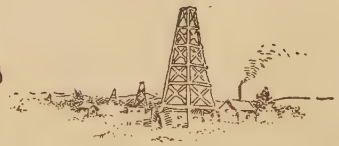
JOHN BROWN'S RAID AT HARPER'S FERRY
1859

DRED SCOTT DECISION 1857

OTHER IMPORTANT EVENTS

FINANCIAL PANIC – 1857	COMSTOCK LODE DISCOVERED – 1858
LAYING OF THE ATLANTIC CABLE – 1857	MORMONS AT UTAH OVERPOWERED – 1858
LINCOLN – DOUGLAS DEBATES – 1858	8TH CENSUS – POP. 31,443,321 – 1860

SECESSION OF SOUTH CAROLINA – 1860



OIL DISCOVERED IN PENNSYLVANIA
1859

Birthplace at Mercersburg, Pennsylvania

BUCHANAN, *bu kan'an,* JAMES (1791-1868), fifteenth president of the United States, remembered as one who tried to carry out a policy of compromise at a time when decisive measures were necessary. It is generally conceded that Buchanan was sincere, but that he failed to measure up to the difficult position which confronted him just before the outbreak of the Civil War.

He was born close to Mercersburg, Pa., of Scotch-Irish parents, and was educated at Dickinson College, Carlisle, Pa. After completing a course in law he was admitted to the bar in 1812 and soon obtained a large practice. He then entered the army and served as a private during the War of 1812, was elected to the Pennsylvania legislature in 1814, and to Congress in 1821, where he remained ten years. In 1831 Buchanan retired from Congress, and he was soon afterwards appointed United States minister to Russia, but was elected to the Senate in 1833. There he vigorously defended the President's right to remove officials without the consent of the Senate.

JAMES BUCHANAN

During Van Buren's administration Buchanan gave his support to the establishment of an independent treasury; under Tyler he sustained the veto power, opposed the ratification of the Webster-Ashburton Treaty and was one of the earliest advocates of the annexation of Texas. In 1845 he left the Senate and became Secretary of State in Polk's cabinet. While occupying this position he was largely instrumental in settling the northwestern boundary between the United States and British provinces. On the election of Pierce, Buchanan was appointed minister to Great Britain. He was a proslavery man and signed the Ostend Manifesto (see OSTEND MANIFESTO). In 1856 he secured the Democratic nomination for the Presidency, and at the election he received 174 electoral votes, being elected over Fremont, the Republican and Fillmore the candidate of the Know-Nothing party.

Buchanan began his term as President high in the confidence and esteem of his party. His career as statesman and diplomat had been an honorable one, and much was expected of him. As President, however, he was unfortunate both in his foreign and in his domestic policies. He eagerly favored the annexation of Cuba, and apparently had hopes of seeing parts of Central America brought into the Union, as he gave encouragement to William Walker, who tried to become dictator of Nicaragua. These policies alienated the antislavery classes and were even disapproved by the Democratic Senators. As time passed by and the North and South drifted farther apart, Buchanan took no steps to avert the threatened breaking up of the Union. He endeavored to maintain an impartial attitude, though he was considered a proslavery man, and when South Carolina and the other Southern states seceded he took the extraordinary position that while the states had no right to secede, the United States had no right to force them to remain in the Union. His lack of decision in protecting Federal property in the South was bitterly resented, and the whole country was relieved when his term of office ended. Retiring to his estate near Lancaster, Pa., he sought seclusion and died there three years after the close of the war.

It is an interesting fact that the question of Buchanan's loyalty was the subject of a debate in the United States Senate in the spring of 1918. The debate came about through the proposal to erect a statue in his honor in Washington; the decision was favorable to him, and the measure was favorably reported.

BUCHANAN, ROBERT WILLIAM (1841–1901), an English poet, critic and novelist, educated at the University of Glasgow. He was for many years a writer for the *Contemporary Review,* published several novels and some good poetry, and wrote the plays of *A Man's Shadow* and *Dick Sheridan.* His criticisms, under the title of *The Fleshly School of Poetry* and *The Voice of the Hooligan,* on Rossetti and Kipling, respectively, stirred up much discussion.

Administration of James Buchanan

I. The President
- (1) Birth
- (2) Parentage
- (3) Education
- (4) Public career
- (5) Character
- (6) Death

II. Dred Scott Decision
- (1) Questions at issue
  - (a) Jurisdiction of the courts
  - (b) Constitutionality of the Missouri Compromise
  - (c) Effect of residence in free state
- (2) Decision of the court
  - (a) No jurisdiction
  - (b) Missouri Compromise unconstitutional
  - (c) Negro not a citizen
- (3) Effect of the decision
- (4) The verdict of history

III. The Crisis
- (1) The Kansas question
  - (a) Struggle for admission
    - (1) Congress votes for admission under the Lecompton Constitution
    - (2) Kansas rejects the Lecompton Constitution
    - (3) Admitted as a free state
  - (b) Breach in the democratic party
    - (1) Northern antislavery
    - (2) Southern proslavery
- (2) Popular education on slavery
  - (a) By speeches
    - (1) Lincoln-Douglas debates
      - (a) Douglas elected Senator
  - (b) By writings
- (3) Personal liberty laws
  - (a) Conflicting with the Fugitive Slave Law
  - (b) Aroused popular opinion
    - (1) Growth of the underground railroad
    - (2) Anger of the South
- (4) John Brown's raid
  - (a) The man
  - (b) The project
    - (1) To call out slaves in revolt
    - (2) To use force
    - (3) Aid from friends in the North
  - (c) The attack
    - (1) Preparations
    - (2) Seizure of the arsenal at Harper's Ferry
    - (3) Failure
  - (d) Results of raid
    - (1) Execution of Brown
    - (2) Roused public opinion
- (5) The election of 1860
  - (a) The Democratic party
    - (1) Charleston Convention
    - (2) Baltimore Convention
  - (b) The Republican party
  - (c) Result of the election
- (6) Secession
  - (a) South Carolina
    - (1) Ordinance of Secession
    - (2) Siege of Fort Sumter
  - (b) Efforts at compromise
    - (1) Crittenden proposal
    - (2) Peace Conference
  - (c) Formation of Confederacy
    - (1) Seven states
    - (2) Constitution
    - (3) Election of Jefferson Davis

Questions on Buchanan

Give a short sketch of the public career of James Buchanan.

What were the questions at issue in the Dred Scott case? How were they decided?

What were the Lincoln-Douglas debates? Why were they important?

Give a brief account of John Brown's attack on Harper's Ferry.

Who were the three leading Presidential candidates in the field in 1860?

State, as briefly as possible, Lincoln's views on the questions at issue.

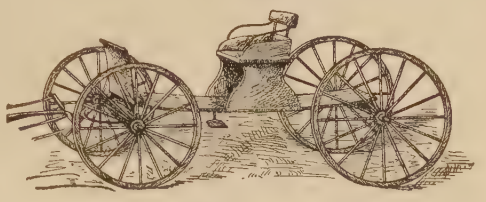
What states formed the newly formed Confederacy?

BUCHAREST, or **BUKHAREST**, *boo ka-rest'*, RUMANIA, the capital city of the kingdom, situated in a fertile plain and on the Dimbovitza River, about thirty-three miles north of the Danube. Bucharest was occupied by the Germans in 1916, and held by them until the conclusion of peace in 1918. In peace times the city is the center of gayety and fashion, and has earned the name of "Little Paris." Among the chief buildings are the royal palace, the national theater, the university buildings, the national bank, the mint and the archiepiscopal church. There are also handsome public gardens. The manufactures are varied, but unimportant; the trade is considerable, the chief articles being grain, wool, honey, wax, wine and hides. The mercantile portion of the community is mostly foreign, and the whole population presents a curious blending of nationalities. The city became the capital of Wallachia in 1665; in 1862 it was made the capital of the united principalities of Wallachia and Moldavia. A treaty was concluded here in 1812 between Turkey and Russia, by which the latter obtained Bessarabia and part of Moldavia. Population, 1910, 293,435; in 1914, estimated, 345,628.

BUCK, DUDLEY (1839–1909), an American musician, known especially as a composer of church music. He was born at Hartford, Conn., studied in Leipzig, Dresden and Paris, and lived in Chicago for several years. Then he became organist of Boston Music Hall and afterwards of Holy Trinity Church, Brooklyn, where he remained for twenty-two years. He wrote a cantata which was performed under the direction of Theodore Thomas at the inauguration of the Centennial Exhibition of 1876, and he also composed many pieces for the organ and numerous anthems. Of special merit are his *Golden Legend*, a cantata based on Longfellow's poem; the *Festival Te Deum* and the overture to *Marmion*.

BUCK BEAN, **BOG BEAN**, or **MARSH TREFOIL**, a beautiful plant, common in spongy, boggy soils, and found in Britain, throughout Europe, in Siberia and in North America. It is from six to twelve inches in height, and it flowers in early summer. The beautiful clustered flowers are waxy white and are covered on the inner surface with a coating of dense fleshy hairs. The whole plant, the root especially, has an intensely bitter taste.

BUCK'BOARD, a four-wheeled carriage, having a plank attached to the hind axle and to a crossbar in front. The crossbar is attached to the front axle by a kingbolt. The buckboard may contain one or more seats. The vehicle obtains its name from the fact that it was originally constructed so as to buck against, or withstand, the rough usage of the poor roads in the New England and Middle states.



BUCKBOARD

BUCKET'SHOP, a place where men may "buy" and "sell" securities or grain on margins (see BOARD OF TRADE). There are no actual purchases or sales of commodities, for the bucketshop owners possess none of them; customers in "buying" or "selling" are merely credited with the money they advance on margins. If the commodity a person "buys" advances in price he may "sell" and receive as profit the difference between the market price at the time of "purchase" and the advanced price. If the price falls beyond the limit covered by his margin and he does not put up further protecting margins he loses his investment, which goes as profit to the management. Margins are usually small; an investment of $100 will secure the "purchaser" of 2,000 bushels of grain against a decline of five cents a bushel.

Bucketshops offer a pernicious form of gambling. The laws in some states have suppressed them entirely, on the ground that they are common gambling houses. Legitimate boards of trade are powerless to prevent bucketshops from securing price quotations, but they have interposed all possible obstacles and have assisted in many prosecutions.

BUCK'EYE, an American name for certain species of horse-chestnuts. Ohio is called the Buckeye State. See HORSE-CHESTNUT.

BUCK'INGHAM, GEORGE VILLIERS, Duke of (1592–1628), a favorite of James I and Charles I of England. In 1623, when the Earl of Bristol was negotiating a marriage

for Prince Charles with the infanta of Spain, Buckingham went with the prince to Madrid to carry on the suit in person. The result, however, was the breaking off of the marriage and the declaration of war against Spain. After the death of James, Buckingham was sent to France, as proxy for Charles I, to marry Henrietta Maria.

In 1626, after the failure of the Cadiz expedition, he was impeached, but was saved by the favor of the king. Despite the difficulty in obtaining supplies, Buckingham took upon himself the conduct of a war with France, but his expedition in aid of Rochelle proved an entire failure. In the meantime the spirit of revolt was becoming more formidable; the Petition of Right was carried despite the duke's exertions, and he was again protected from impeachment only by the king's prorogation of Parliament (see PETITION OF RIGHT). He then set out on another expedition to Rochelle, but was assassinated while embarking.

BUCKLE, HENRY THOMAS (1821–1862), an English historical writer who devoted the best years of his life to the writing of a *History of Civilization*. Though he labored for seventeen years on this work, when he died only two introductory volumes were completed. The work was characterized by much novel and suggestive thought and by the use of a vast store of materials drawn from the most varied sources, and has been helpful in arousing interest in historical research.

BUCK'NER, SIMON BOLIVAR (1823–1914), an American soldier and politician, born in Kentucky. He was educated at West Point and served with distinction in the Mexican War. At the outbreak of the Civil War he joined the Confederate army and performed good service throughout the war, especially in the defense of Fort Donelson, at Murfreesboro and at Chickamauga. On May 26, 1865, he surrendered the last army corps of the Confederates to General Canby, of the Federal army. In 1896 Buckner was a candidate for the vice-presidency on the National (Gold) Democratic ticket, with Senator Palmer of Illinois.

BUCKSKIN, a soft leather made from the skin of sheep, and used as a material for gloves. The leather acquires its characteristic softness from oil used in the dressing. Buckskin may be either gray or yellowish. It was formerly employed as a garment material by the Indians and plainsmen, and the term is a common one in stories of the West. At the present time the name is applied to a twilled woolen fabric from which riding breeches are made.

BUCKTHORN, an important group of trees and shrubs, several species of which belong to North America. The common buckthorn, a British and North American shrub, grows to seven or eight feet in height, has strong spines on its branches, elliptical and serrated leaves, male and female flowers on different plants, a greenish-yellow calyx, no corolla and a round, black berry. The juice of the ripe berries, mixed with alum, forms an olive-green coloring matter used by artists, and the berries also have laxative properties. One species in the Pacific states yields the Cascara bark which is used medicinally.

BUCKWHEAT, a plant producing a three-sided seed and usually styled a grain. It is, however, very different from the grains; it belongs to the same family as the pieplant.

The origin of buckwheat is not known, but it is supposed to be a native of Asia and was therefore named *Saracen wheat* by the French. The plant has smooth, branching stems, green leaves with dark veins, and white flowers. It takes its name from a German word meaning *beech wheat*, because of the resemblance of the seeds to the beechnut. Buckwheat grows in poor soil and is extensively cultivated in China and other Eastern countries as a food plant. In Europe the seed is used principally as feed for stock and poultry, but in the United States and

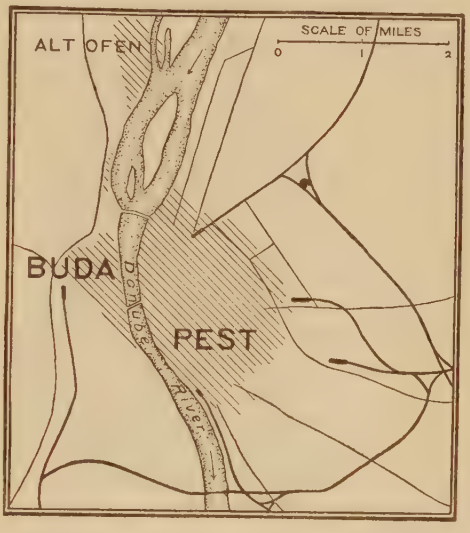
BUCKWHEAT

Canada it is quite extensively used to make flour from which breakfast cakes are prepared. The plant has other uses. Its flowers are visited by bees, for the nectar makes an excellent dark-colored honey. Buckwheat is sometimes used in brewing and in the preparation of cordials, and the blossoms are the source of a brown dye.

Buckwheat has for many years been a secondary crop in America, but its short growing season and its ability to thrive in poor soil had the effect of stimulating its production under the stress of war conditions. In 1917 the acreage devoted to buckwheat was 1,006,000 acres, as compared with 828,000 acres for 1916. The output for the year was estimated at 17,460,000 bushels. New York and Pennsylvania are the leading states in amount of crop, producing over half of the total output for the country. Michigan is also an important buckwheat state. In Canada the average yield is from 7,000,000 to 9,000,000 bushels, valued at over $5,000,000.

BUD, an undeveloped stem, leaf or flower. The purpose of the leaf bud is to carry the living parts of the leaf safely through winter or an unfavorable season. By opening a large leaf bud, such as one may find on a hickory tree, it is possible to see the regular transition from the perfect leaves within, to the very simple, hairy scales that act as protective organs on the outside. The leaflets are packed away in perfect and regular order, always the same in any one kind of plants. For instance, the two halves of the cherry leaf are folded together with the under surfaces outward; in the common wood sorrel, each leaflet is folded smoothly, and then the three are packed away closely side by side. Special means of protection for the delicate inner parts are provided by nature in the way of waterproof varnish, warm woolly coats and thick, strong husks.

BUDAPEST, *boo'da pest*, HUNGARY, the capital and largest city of the new republic. Next to Vienna it was the largest city in the old Austro-Hungarian monarchy. It is made up of two cities on the Danube River, Buda on the west bank and Pest on the east bank, the two being connected by several fine bridges. Buda, the smaller and more ancient of the two, is situated on and about a hill, which is crowned with a citadel and the royal palace. The city is noted for its bitter-water springs, such as the Hunyadi Janos and others. Pest lies in a sandy plain and has an extensive frontage on the Danube. It has many beautiful buildings, among which are the new houses of Parliament, an academy of science, a national picture gallery, a national museum, a university and the royal opera house. The city is well endowed with educational and scientific institutions. Budapest is known also for its



beautiful streets, the finest of which is Andrassy Strasse, one of the handsomest boulevards in Europe.

In commerce and industry, Budapest ranks next to Vienna, and it is one of the world's largest flour-milling centers. Other manufactures are machinery, cutlery, glass, metal and leather articles, cement and liquors.

The history of Buda dates back to about A. D. 150, when the city was the site of a Roman camp. In the sixteenth and seventeenth centuries it belonged to the Turks, and it stood many sieges in this time. In 1848, under the Hapsburgs, it was taken by the Hungarians, after a heroic defense by Hentzi. Pest is of later origin, having been first a town inhabited by Germans in the thirteenth century. In the middle of the nineteenth century it became the capital of the Hungarian kingdom, and in 1873 it was united with Buda as Budapest. In 1918 the city was the scene of many disturbances due to political discontent and food shortage growing out of the World War, and with the dissolution of the Austro-Hungarian monarchy it became the capital

of the Hungarian Republic, proclaimed on November 16, 1918 (see HUNGARY; WORLD WAR). Population, 1910, 863,735.

BUDDHA, *bood'ah*, (the Wise or the Enlightened), the sacred name of the founder of Buddhism, a sage who is supposed to have lived in India in the sixth century B. C. His personal name was Siddhartha, and and his family name Gautama. His father was king of Kapilavastu, a few days' journey north of Benares. Of the youth of Buddha little is known, except what comes through legends. These have been used by Edwin Arnold in his *Light of Asia*. Buddha's father, noticing his habit of religious dreaming and his desire for solitude, built for him a palace and surrounded him with every luxury that would induce him to remain at home. But fearing age, disease and death, the son left his father's court and studied with the Brahmans. He then went into solitude under a bo tree and resolved to remain till he had gained a knowledge of the past, the present and the origin of evil.

BUDDHA

After a long period of meditation, fasting and self-torture, he came to the conclusion that this life is one link in a chain of transmigration, and that only extinction of all desire will deliver from suffering. Commencing at Benares, he began to teach his new faith, in opposition to the prevailing Brahmanism. Among his earliest converts were the monarchs of Magadha and Kosala, in whose kingdoms he passed most of the latter portion of his life, respected, honored and protected. See BUDDHISM.

BUDDHISM, *bood'iz'm* the religious system founded by Buddha, one of the most prominent doctrines of which is that *Nirvana*, or an absolute release from existence, is the chief good. According to Buddhism pain is inseparable from existence, and consequently pain can cease only through Nirvana; and in order to attain Nirvana the desires and passions must be suppressed, the most extreme self-renunciation practiced, and the individual must, as far as possible, forget his own personality. In order to attain Nirvana eight conditions must be kept or practiced: right view, right judgment, right language, right purpose, right profession, right application, right memory and right meditation.

The five fundamental precepts of the Buddhist moral code are not to kill, not to steal, not to commit adultery, not to lie and not to give way to drunkenness, to which are added five others of less importance, binding more particularly on the religious class, such as to abstain from repasts taken out of season and from theatrical representations. There are six fundamental virtues to be practiced by all men alike, namely, charity, purity, patience, courage, contemplation and knowledge. These are said to "conduct a man to the other shore." The devotee who strictly practices these virtues has not yet attained Nirvana, but is on the road to it.

The Buddhist virtue of charity is universal in its application, extending to all creatures and demanding sometimes the greatest self-denial and sacrifice, as exemplified in the legend that Buddha, in one of his stages of existence (for he had passed through his numerable transmigrations before becoming "the enlightened"), gave himself up to be devoured by a famishing lioness, which was unable to suckle her young ones. There are other virtues, less important, indeed, than the six cardinal ones, but still binding on believers; lying is forbidden; evil-speaking, coarseness of language and even vain and frivolous talk must be avoided. The essential theories of Buddhism are the theory of transmigration (borrowed from Brahmanism), which is so complete that a worm may become a supreme Buddha; the theory of the mutual connection of causes, and the theory of Nirvana.

Buddha did not leave his doctrines in writing; he declared them orally, and they were carefully treasured by his disciples and written down after his death. The canon of the Buddhist scriptures, as we now possess

it, was the work of three successive councils and was finished at least two centuries before Christ. Buddhism was pure, moral and humane in its origin, but it came subsequently to be associated with idolatrous worship of its founder and other deities. In many things it ranks next to the Christian religion, but it is selfish, in that all these acts of wisdom are for the individual himself, in order that he may gain annihilation. Although now long banished from Hindustan by the persecutions of the Brahmans, Buddhism prevails in Ceylon, Burmah, Siam, Anam, Tibet, Mongolia, China, Java and Japan, and its adherents are said to number 500,000,000.

BUDGET, *buj'et,* an official summary of the finances of a country, with a statement as to the expected receipts and expenditures for the year to come. The necessity for such orderly presentation rests upon the fact that in all constitutional governments the people have the final decision as to raising money and are in full control of the national finances. In Great Britain the budget is presented to the House of Commons by the Chancellor of the Exchequer; in Canada by the Minister of Finance. In the United States the Committee on Appropriations in the House of Representatives prepares the list of expenditures for the coming year, while the Committee of Ways and Means prepares the laws to raise the necessary amount of money. The American system has been criticized as wasteful and unscientific, and there is a strong movement for the substitution of the budget system. The need of such a system was especially apparent after America entered the World War.

The Private Budget. The preparation of a budget for private or family spending is one of the wisest forms of thrift and economy. Careless, haphazard spending breeds extravagance; spending according to a well-planned budget makes for increase in efficiency, more comfort, the elimination of waste and a better-balanced life. An itemized statement should be made for each month, showing the total income, the allowance for rent, table, gas, telephone, clothes, recreation, etc., and the amount which can be saved. This budget should be intelligently and carefully followed, for it is living up to a budget, not merely preparing one, that results in financial independence.

BUELL, *bu'el,* Don Carlos (1818–1898), an American military leader, conspicuous in the Civil War. He was a graduate of West Point, and saw active service in the Mexican War. At the outbreak of the Civil War Buell was appointed brigadier-general of volunteers, and was soon placed in command of the Department of the Ohio. In February, 1862, he occupied Nashville, was later raised to the rank of major-general of volunteers, and in April gave Grant conspicuous aid at the Battle of Shiloh. Two months later Buell was placed in charge of the Army of the Ohio, and during the summer was engaged in driving Bragg out of Kentucky. Because of adverse criticisms regarding his pursuit of the Confederates, he was tried by a military commission, which reported against him. On June 1, 1864, he resigned from the service.

BUENA VISTA, *bwa'na vees'ta,* Battle of, an important battle of the Mexican War, between an American force of 5,000, under General Zachary Taylor, and a Mexican army of 17,000, under Santa Anna. It was fought on February 22 and 23, 1847. The Mexicans were the first aggressors, making several unsuccessful attempts to dislodge Taylor from a strong position on Angostura Heights. One of these attempts was all but successful, only the poor generalship of Santa Anna saving the Americans from defeat. On the second day the Mexicans were driven from the field. The losses of the Americans were about 750; of the Mexicans, fully 2,000. The battle was the last important engagement of the northern campaign, and gave the Americans control of Northeastern Mexico.

BUENOS AIRES, *bway' nohs i'raz,* or *bo'nus a'riz,* Argentina, a beautiful city on the Rio de la Plata, capital and largest city of one of South America's most progressive republics. Next to Paris, Buenos Aires is the largest Latin city in the world, and it is first in population among the cities south of the equator. It is situated 175 miles from the mouth of the river, but as the stream is nearly thirty miles wide at this point, and is navigated by large vessels, the place is to all intents and purposes an ocean

port; its foreign trade is large and is rapidly increasing. It is also an important railroad terminal, the principal one in Argentina.

Buenos Aires lies on a broad, level plain, and occupies nearly seventy-three square miles. It is a well built city, with handsome boulevards, parks, fine public buildings and many luxurious private homes. In the oldest sections one may see the typical Spanish home, with open court and heavily-barred windows. The Plaza de la Victoria, 1,200 feet long and 640 feet wide, occupies a prominent position in the central part of the city and is surrounded by public buildings, among which are the hall of Congress, the government palace, the municipal building and the departmental palace, the Hotel Argentine, the Episcopal palace and the Cathedral. There are, besides these buildings, a number of Roman Catholic and Protestant churches and about twenty theaters. The educational institutions include the national university, considered the finest in South America, a normal school and numerous public and private schools. Buenos Aires is the leading manufacturing town of South America, and its industries give employment to over 118,000 men. Among the manufactures are machinery, carriages, leather, boots and shoes, textiles, hides, tobacco and spirits. Population, 1910, 1,329,697; in 1917, estimated, 1,700,000.

In the early months of 1919 Argentina, and particularly Buenos Aires, was seriously affected by the virus of bolshevism, which was spreading with such rapidity that it threatened the security of all human society. Riots occurred in the city as serious as those in parts of Germany, but they were put down by the military, after the destruction of considerable property and the loss of a number of lives.

BUFFALO, a name given to several species of wild cattle, the best known of which is the common or Indian buffalo, larger than the ox and with stouter limbs, originally from India, but now found in most of the warmer countries of Asia. The buffalo is less docile than the common ox and is fond of marshy places and rivers. The female gives much more milk than the cow, and from milk the *ghee*, or clarified butter, of India is made. The hide is exceedingly tough, and a valuable leather is prepared from it, but the flesh is not very highly esteemed. A smaller variety of this species, called the *carabao* (which see), is found in the Philippines, where it is used as a beast of burden. The *Cape buffalo* of Africa is distinguished by the size of its horns, which are united at their bases, forming a great bony mass on the front of the head. It is the largest and fiercest buffalo known.

Bison, or American Buffalo. As late as 1870 large sections of the western plains of the United States were black with herds of the American buffalo, whose scientific name is *bison*. According to the zoölogist, the bison

THE AMERICAN BUFFALO

is technically not a buffalo, because of differences in structure. The bison has fourteen ribs, one more than the buffalo; and its head, neck and shoulders are heavier and its withers lighter than those of the Old World species. In common speech, however, the name bison is less generally heard than the other name. A full-grown male of the American species is six feet high at the shoulders, and weighs 2,000 pounds. Its head, neck and shoulders are clothed with a thick growth of dark brown hair, and it has a great hump or projection over its fore-shoulders. The tail is short and tufted at the end, and the horns curve upward. In pioneer days the skins of the buffalo, dressed with the hair on, were used by the whites and Indians as robes and overcoats, and the Indians highly esteemed the flesh of the animal. The great herds of the plains have disappeared, but a few specimens may be seen in zoölogical gardens, and there are several hundred in Yellowstone National Park, and about 2,000 in Buffalo Park (Canada), under government protection.

BUENOS AYRES, ARGENTINA

National legislative building, with gardens in foreground. A view of a little known city which rivals Paris in beauty

BUFFALO, N. Y., the county seat of Erie County, the second largest city of New York and the eleventh in size in the United States, is situated at the eastern end of Lake Erie, at the head of the Niagara River. It is twenty miles southeast of Niagara Falls, 439 miles northwest of New York and 523 miles slightly northeast of Chicago. As the western terminal of the old Erie Canal and of the new enlarged Barge Canal, Buffalo has direct water connection with the Atlantic, and it also enjoys boat connection with Canadian ports by means of the Welland Canal. The city is thus admirably situated for enduring industrial and commercial development. Twelve trunk lines enter the city, among which are the Buffalo, Rochester & Pittsburgh, the Delaware, Lackawanna & Western, the Grand Trunk, the New York Central, the Pennsylvania and the Wabash.

General Description. Buffalo originally grew up about the shallow mouth of Buffalo Creek. This harbor proved to be far inadequate to the needs of the city, and it has been deepened, and enlarged by the construction of a ship canal extending southward from it parallel with the shore of the lake. At the present time the city has over ten miles of wharfage. By the construction of a series of breakwaters in the lake outer and inner harbors have been created; one of the breakwaters, built by the United States government, is the longest in the world.

The city is pleasantly situated on a rise of land sloping gently from the lake, affording a pleasing outlook over the water and the Canadian shore. Broad, well-paved streets with many large shade trees add to the general attractiveness of this prosperous city. Main Street, the principal business thoroughfare, runs north and northeast from the lake front to the city limits. North, Summer and Ferry streets and Lincoln Parkway are among the principal residence streets, and Niagara Street is a through highway from Buffalo to the northern suburb of Tonawanda. Main, Niagara and several other streets meet near Lafayette Square, the principal business center.

Parks and Boulevards. Buffalo has a total park area of almost 1,200 acres, and its larger parks are joined by handsome boulevards. On the north side of the city is Delaware Park, where the Pan-American Exposition was held in 1901; among its attractions is a lake of forty-six acres. "The Front" is a beautiful parked area of forty-five acres along Lake Erie, and north of this is Fort Porter, a United States military post. In the eastern part of the city is Humboldt Park, and on the south side are South Park, with its magnificent conservatory, and Cazenovia Park. In the environs of Buffalo are such popular resorts as Niagara Falls, Crystal Beach and Fort Erie Beach (in Canada).

Buildings and Institutions. Buffalo has a large number of handsome public buildings. Among the more important of these are the United States government building, which cost $2,000,000, the city and county hall, the Masonic Temple, the Chamber of Commerce, Merchants' Exchange, the Sixty-fifth and Seventy-fourth regiment armories, the state hospital for the insane, the Ellicott Square building, covering a city block, the New York Telephone, Marine Bank, Electric and Iroquois buildings and a large number of churches and clubs. The elevated portions of the city are also notable for the many fine residences which they contain.

The educational institutions include excellent public schools, schools for manual training, domestic arts and vocational training. There are many private schools and academies and several institutions of collegiate rank, including the state normal school, the University of Buffalo and Canisius College. There are about seventy-five philanthropic institutions, prominent among them being the Buffalo Orphan Asylum, German Orphan Asylum (Roman Catholic), Saint Vincent's Asylum, Saint Mary's Institute for Deaf-Mutes, German Hospital, Children's Hospital, Sisters of Charity Hospital, and the Buffalo General Hospital. The city owns a special tuberculosis hospital, built at a cost of $1,000,000. The Buffalo Public Library and the Grosvenor Library, also open to the public, together contain over 425,000 volumes. The Buffalo Historical Society and the Albright Art Gallery each occupy magnificent marble structures in Delaware Park.

Commerce and Industry. Buffalo is not only one of the greatest American ports, but

it is one of the most important in the world with an annual tonnage approaching 20,000,000. Immense quantities of wheat, flour, lumber, ore and fish are carried to the city by way of the Great Lakes and from there shipped to other cities. Buffalo has grain elevators with a total storage capacity of 22,000,000 bushels, it can take care of 5,000,000 bushels a day. It is also one of the foremost American live-stock markets. In manufactures of all sorts it ranks next to New York among the cities of the state, and in iron manufacture is second only to Pittsburgh. About 22,000 men are engaged in the manufacture of foundry and machine-ship products. One of the largest steel plants in the world is located in one of Buffalo's suburbs, Lackawanna. As a market for linseed oil Buffalo holds first rank among American cities. The rapid devlopment of the city as a manufacturing center was due partly to its favorable situation in regard to shipping, and partly to the abundance of power provided by the falls of the Niagara.

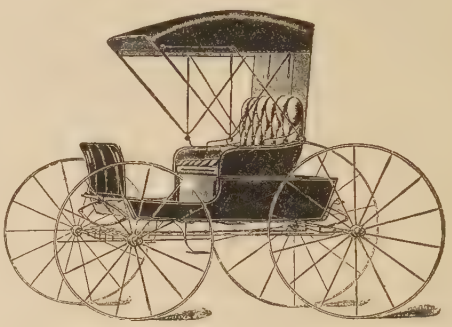
History. The site of the city was first visited by La Salle in 1679. In 1792 the first white settler appeared, and the locality became a center for fur traders. Between 1798 and 1803 the township was laid out. The growth of the settlement was slow, and in 1813 it was completely destroyed by the British. Two years later the town was rebuilt, and after the completion of the Erie Canal, in 1825, it developed steadily. In 1832 it was chartered as a city, and eleven years later erected the world's first grain elevator. In 1901 the Pan-American Exposition was held at Buffalo, during which President McKinley was fatally shot. Population, 1910, 423,715; in 1917, 475,781 (Federal estimate).

BUFFALO BILL. See CODY, WILLIAM FREDERICK.

BUFFALO GRASS, a hardy, nutritious North American grass, so called because it once formed a large part of the food of the buffalo, or bison. The blades of this grass are about six inches long, and when burned by the summer sun they become crisp, curly and light brown in color. It is still a valuable fodder on the cattle ranges of the West.

BUG, the name given to any insect belonging to the order Hemiptera. The beak is bent toward the breast and is adapted for sucking or piercing. Among the most common and troublesome bugs are the bedbug, chinch bug and louse. In the United States the word is used synonymously with beetle (which see).

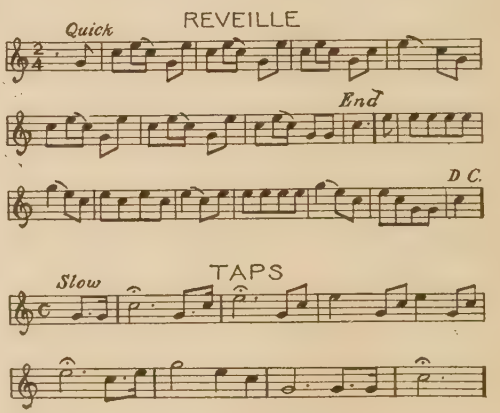
BUG'GY, in the United States the name given a light, one-horse, four-wheeled vehicle, with or without a top or hood. In England, however, the term means a light, one-horse,



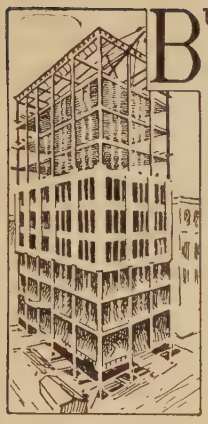
TOP BUGGY

two-wheeled vehicle, with or without a hood, such as, in the United States, is called a *cart.*

BUGLE, *bu'g'l,* a wind instrument, resembling the trumpet but having a shorter tube and a smaller bell-shaped opening. Its note has a penetrating quality which makes it a good instrument for military calls and signals. In peace the soldier is reminded of every routine duty by a special call from a



bugler, while in war, in addition, his marches and movements are directed and guided by its calls. *Reveille* is the first call of the day and its purpose is to awaken the soldiers. *Taps* is the last call of the day. Besides these there are calls of warning, of formation, of service, etc.



BUILDING, *bild'ing*, the art of constructing buildings; also, the structure erected. Building includes all those mechanical operations necessary to fashion or construct the materials and to erect these materials into a finished structure. The most important trades connected with building are carpentry, masonry, brick-laying, plastering, iron-working, quarrying, painting and glazing. Taken together, these are often spoken of as the *building trades*. There are also numerous other industries closely related to building, but classed as manufactures, such as the making of brick, glass, nails, screws and other hardware, all of which are used in building.

The main parts of a building are the foundation, the body and the roof. The *foundation* is of great importance. It must be solid, immovable. The construction of foundations for small buildings is a simple matter. They are made of brick, stone or wood, but the last is seldom used except for temporary structures. Stone or brick foundations are laid in trenches, which should be deep enough to extend below the frost line. For country buildings rough stones called *rubble* are often employed.

The foundations for large buildings, such as those erected in cities, often require the greatest of engineering skill. They must be sufficiently strong to support the great weight of the building and must rest upon soil or rock which is unyielding. The kind of foundation in such cases depends very largely upon the nature of the soil and the weight of the structure. Where a firm foundation cannot be reached except by excavating to a great depth, piles are often used. These are driven down until they reach a rock or other layer which will hold them firmly, their tops are then fastened together by wooden or iron beams, and the space between is filled with concrete. This makes a very firm foundation and one which will support a building of great weight. A more recent plan is to use concrete pillars instead of piles. These are made by excavating a round hole, until the rock below is reached, and then filling this with concrete, so as to make a firm support. The supports of the building are then placed upon these concrete pillars. Sometimes foundations must extend over 100 feet underground.

The *body* of the building is designed to meet the requirements for which the structure is erected. It may be of wood, brick or stone. When the exterior walls are of brick or stone they seldom need a frame, and the framework necessary is that for supporting the partitions and floors. However, if the building is of wood, the frame is erected first, then this is covered on the outside with boards and siding, and on the inside with lath and plaster. The partitions are built in a similar way. In large cities buildings are now generally constructed with steel frames. The frame consists of girders of rolled steel, which are strongly riveted together and braced. These girders contain ledges, upon which the brick or stone forming the exterior walls is supported. Such buildings are very strong and contain much less material in the exterior walls than would be necessary were the steel frame dispensed with. By using tiling for partitions and floors, steel-frame buildings can be made so that they are practically fireproof. One of these structures in New York City is fifty-five stories in height, another is forty stories. The Masonic Temple in Chicago is twenty-one stories high, but sixteen stories, or 200 feet, is now the limit allowed in the latter city.

The style of *roof* of the building depends upon the size and style of the building. Small buildings usually have roofs sloping from the middle downward to the sides, forming what is called a double roof. The triangular ends of such buildings are known as *gables*. Tall buildings have a flat roof, which has a slight incline to one side. Roofs are covered with shingles, slate, tin or tar and gravel. Shingles and slate are generally used for steep roofs, and tin or gravel for flat roofs.

Related Articles. Much additional information relating to building will be found in the articles, Architecture; Building Laws; Building Stone; Lumber.

BUILDING AND LOAN ASSOCIATIONS, or **BUILDING SOCIETIES**, joint stock benefit societies for the purpose of raising by periodical payments a fund to assist members in obtaining homes. These are mortgaged to the society till the amount of the shares drawn on shall be fully repaid

with interest. These societies may be divided into two classes, *proprietary* and *mutual.* The former take money on deposit, paying interest therefor, and give loans for building purposes, or the like, repayable by installments. The profit of the company lies in the difference between the rate charged to the borrowers and the rate paid to depositors.

In the mutual societies, each depositor becomes, to the extent of his deposit, a stockholder. One who wishes to borrow money to invest in land or to build a home may subscribe for a certain number of shares, equal in value to the amount of money he borrows, mortgaging his property as security. He pays for this stock small periodical installments (usually weekly or monthly), until the stock is paid for. Thereupon he surrenders his stock and his mortgage is cancelled. Strict laws everywhere govern such institutions.

BUILDING LAWS. In an earlier day men could construct buildings without due regard to the wishes of their neighbors, or without due consideration for health and sanitation. They were practically a law unto themselves, as they are still in many communities. However, in congested districts particularly, and quite generally throughout large cities, much consideration has been given to many elements affecting the public welfare and public health, as well as to aesthetic considerations.

In attractive residence localities there may be legal specifications requiring houses to be set back a certain number of feet from the road; residences must not be placed nearer than a certain number of feet from each other, in order to give light and air; to protect against fire large cities do not permit construction of wooden buildings. In most cities there is no restriction upon the height to which business blocks shall be built; there is no such restriction in New York, and that city has become noted for the tallest buildings in the world. Many there are thirty stories in height, some are forty, and one, the Woolworth building, reaches fifty-five stories above the ground. There is a distance of 765 feet from sidewalk to the observation platform. In Chicago, before restrictions were established, the Masonic Temple was built twenty-one stories high, reaching 354 feet above the ground. Later, however, a building law was passed restricting the height of Chicago buildings to 260 feet, or twenty stories; still later the height was reduced to 200 feet, or sixteen stories.

Restriction of height of buildings in business districts is deemed essential to provide for free circulation of air and the entrance of light, both being conditions of health. In most cities no building reaching four stories in height can be without conveniently-located fire escapes. Frequently laws will declare how buildings shall be lighted and how they shall be drained, in order that sanitary conditions may be assured and that possibility of disastrous fires may be diminished.

BUILDING STONE, a class of stones used in the construction of foundations and walls of houses, in making bridges and piers, and in interior finishing. Each of the stones in common use has its particular virtues, possessing qualities which make it adapted to certain purposes. Strength, durability and beauty are some of these qualities. The selection of a stone also depends upon the ease with which it may be quarried, and its accessibility.

The most durable stone known is granite, and it is especially desirable for foundations supporting heavy weights. Imposing public buildings of massive structure are often made of granite. Limestone is a valued stone for trimmings and for foundations and walls not demanding so heavy a stone as granite. One of the most pleasing decorative stones is marble, which is limestone purified and crystallized by heat. Sandstone (brownstone) is a popular material for city dwellings of the more pretentious class, and slate is widely utilized in making sinks and mantels. Most of these stones are described elsewhere under special headings.

All stones are subject to deterioration from the weather, but the different varieties show wide variation in this respect, as indicated by the following table:

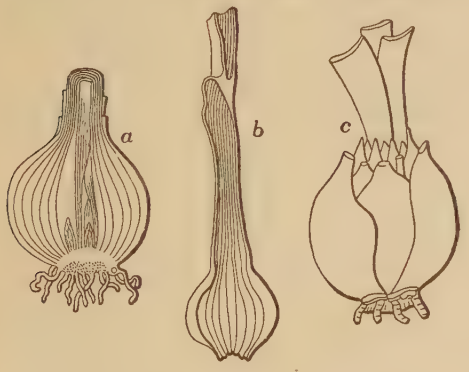
VARIETY	LIFE IN YEARS
Coarse brownstone	5 to 10
Fine brownstone	20 to 50
Coarse fossiliferous limestone	20 to 40
Marble, coarse dolomitic	40 to 50
Marble, fine	50 to 100
Granite	75 to 200
Best Ohio limestone	100 to 200
Nova Scotia limestone	50 to 200

BUKOWINA, *boo ko ve'nah,* until late in 1918 a crownland and duchy of the Austrian

empire. On the dissolution of the dual monarchy of Austria-Hungary, toward the end of the World War, Bukowina was claimed by Rumania as a part of its reorganized state. The final decision was left to the peace conference which began sittings in Paris in 1919. Bukowina lies west and north of the Rumanian boundaries as they existed in 1914. It has an area of 4,031 square miles, about half that of New Jersey, and a population of 818,328 (estimate for 1913). Czernowitz, the capital city, is the seat of one of the eight Austrian universities.

The principal rivers are the Pruth, Sereth and Dniester. The soil in their valleys is very fertile, and the crownland produces good crops of cereals, fruits and vegetables. Cattle raising, milling and the manufacture of liquor are important industries. Bukowina was the scene of serious fighting during the World War. In June, 1916, it was completely occupied by Russian troops, but the following year the Russians were driven out by Austro-German forces. From that date to the dissolution of Russia following the abdication of the czar, the Austro-Germans held the country only by constant vigilance and frequent severe and costly fighting.

BULB, a modified leaf bud formed on a plant, either upon the ground or beneath its



BULBS
a, section of onion bulb; b, leaf from onion bulb; c, bulb of lily.

surface. Roots grow from the base, and from the center a stem grows. The bulb is formed by the bases of leaves or by thin coats and layers, which are, in reality, modified leaves. The function of a bulb is to store nourishment to enable plants to complete their growth more rapidly than would be possible from the seed. The onion, tulip and common lily are good examples of bulb plants.

BULGARIA, for some time known as the "young giant of the Balkans," is one of the several small states of the easternmost peninsula of Europe. It was the only Balkan state to join the Germanic alliance in the World War, and its decision to cast its lot definitely with the central powers prolonged the struggle by vastly strengthening Germany's position. Bulgaria, however, was the first member of the alliance to surrender to the allies, and was therefore directly responsible for the sudden ending of the war.

The area of the country at the outbreak of the war was 43,305 square miles. According to the boundaries existing at that time it lay south of Rumania, east of Serbia, north of Greece and the Aegean Sea, and west of the Black Sea and European Turkey. Bulgaria is one of the states which fought their way from the status of Turkish dependencies to the position of free and independent nations. During the concerted drive against Turkey in 1912–1913 in the Balkan Wars it was perhaps the most intrepid member of the coalition against the Ottomans. That the coalition turned against Bulgaria after victory had been won from the Turks is one of the ironies of a situation which had its aftermath in the great World War, in 1914.

The People of Bulgaria. The great majority of the inhabitants of the country are Bulgarians. Next in point of number are the Turks, of whom there are over 488,000; Rumanians, Greeks, Gypsies and other European nationalities comprise the remainder. The Bulgarians are a strong, broad-shouldered race, whose stocky build suggests their dominant national trait—solidity of character. In complexion and features they are more Oriental than European, but they have none of the vices of the Orient. On the contrary, they are passionate lovers of education, their moral standards are high, and they are industrious and thrifty. The mass of the people are peasants who practice various forms of agriculture. In 1914 the population was 4,752,997.

Education and Religion. Primary education in Bulgaria is free and compulsory. In the higher grades only the rich pay fees. Schools corresponding to high schools have been established in all the large towns, and at Sofia there is a university which in peace times is attended by over 2,000 students. At Philippopolis, the ancient Philippi of the New Testament, a boys' high school costing $150,000 has been erected, and there is an excellent girls' school in the same town. The national religion is the Orthodox Greek, but the State Church is outside the jurisdiction of the Patriarch of Constantinople (see GREEK CHURCH). Though the great majority of the people belong to the Orthodox Church, several other religious bodies are represented, especially the Roman Catholic, Protestant, Gregorian Armenian, Jewish and Mohammedan.

The Land. There are three distinct physical divisions—the valley of the Danube in the north, the Balkan Mountains farther south, and the lowland region bordering the Aegean Sea. The Balkan Mountains are responsible for two distinct climatic zones. In the northern section between the Danube and the mountains there are long, severe winters, and the skies are clouded most of the time. Beyond the mountain barriers, however, a temperate climate prevails, and the valleys of the southern slopes are fragrant and beautiful with roses. These are cultivated by the hundreds of thousands for the perfume trade (see ATTAR). In the extreme south one finds a mild climate similar to that of Italy.

Resources. The valley of the Danube and that of the Maritza, which drains Southern Bulgaria (or Eastern Rumelia), are among the most fertile sections of the Balkan peninsula, and agriculture is an industry of first importance. The farmers themselves own the land, and the great majority of the farms are less than fifty acres in extent. Wheat, the most important grain crop, is followed in order by maize, barley, rye and oats. Potatoes are raised in large quantities, and rice and cotton are important products in the south. Other branches of agriculture are tobacco growing and beekeeping. The silkworm industry is also carried on; the cultivation of roses has already been mentioned. Of late years the yield in all lines of agriculture has been stimulated by the introduction of improved farm implements. Bulgaria also has splendid mountain forests of oak, pine and beech.

All minerals are state-owned. At least three coal mines are in operation, and over 1,000,000 cubic yards of stone are quarried annually. Other mineral products are iron, gold, silver, lead, manganese and copper.

Transportation and Commerce. At the outbreak of the World War there were 1,486 miles of railway open to traffic, and by 1916 the mileage had increased to 1,824. Sofia is connected by rail with the general European system, and plans have been made to connect the Danube River and the Aegean Sea. The principal ports of the country are Varna and Bourgas on the Black Sea, and Rustchuk, Sistor and Vidin on the Danube. A large portion of Bulgaria's foreign trade is with Germany and Austria-Hungary. The principal exports are wheat, live stock, attar of roses, woolens, skins, dairy products, silk cocoons, tobacco and timber. Manufactured goods are imported in large quantities.

Government. Bulgaria is a constitutional monarchy. The executive power is vested in a king, who is assisted by a Cabinet of eight Ministers. The king's approval of laws passed by the Sobranje, or National Assembly, is necessary to make them effective. The Sobranje consists of a single chamber whose members are elected by universal manhood suffrage at the rate of one member to every 20,000 of the population. Bulgaria is divided into seventy-one districts for purposes of local government. Sofia is the capital city.

History. Bulgaria came under the rule of the Turks toward the close of the fourteenth century. In 1878, by the Treaty of Berlin, it was created a principality under the suzerainty of the sultan, and by the same treaty Eastern Rumelia (Southern Bulgaria) was created a dependency of the Ottoman Empire. In 1885 a revolution in Eastern Rumelia overthrew the Turkish rule and a union of the two states was proclaimed. Ferdinand of Saxe-Coburg, an officer in the Austrian army, was offered the throne in 1886, and the following year he accepted it, assuming the title of prince. In 1896 the powers formally recognized him, and when United Bulgaria declared its independence, in 1908, he became Ferdinand I, with the title of king. In 1909 the European powers and Turkey gave him formal recognition.

The Balkan War of 1912–1913, in which Serbia, Montenegro, Greece and Bulgaria

forced Turkey to give up most of its European territory, was a sore disappointment to Bulgaria because Serbia was awarded territory which had been promised to Bulgaria by a secret arrangement between these two nations. A second war broke out in June, 1913, in which the allies, reinforced by Rumania, leagued themselves against Bulgaria. That nation was too exhausted to maintain an effective resistance against so many enemies, and was obliged to agree to an unfavorable peace treaty. After the outbreak of the World War both the entente and the central powers maneuvered for Bulgaria's support, and both sides made promises of territorial additions. The central powers were the more successful bidders, however, and in October, 1915, Bulgaria entered the war as an ally of Germany, Austria-Hungary and Turkey. The same month Bulgarian troops invaded Serbia and coöperated with the Austro-German armies in the subjugation of that country.

Until late in 1918 Bulgaria maintained its military supremacy in the Balkan Peninsula, as the allies, even after Greece joined the entente, did not feel strong enough to break through on the "Eastern Front." The addition of America's great army, however, the force of which was first felt in the summer of 1918, changed the situation completely. In July, Italian and French troops cleared Southern Albania of the enemy, and in September a concerted allied attack was begun against the Bulgarian forces in Macedonia and Serbia. On September 26 the Bulgarians asked for a suspension of hostilities, and in a few days they surrendered unconditionally. This move cut off German communications with Turkey, and paved the way for the utter collapse of the Quadruple Alliance.

King Ferdinand, depressed and in bad health, abdicated on October 3, and was succeeded by his son Boris I. Conditions were turbulent throughout the country for weeks afterward, and it was reported that a republic had been established. The facts of the case seem to be that a Cabinet was formed of democratic leaders who desired a republic, but that Boris was permitted to keep the throne because he gave evidence of being thoroughly in sympathy with democratic ideals. A strong faction in Bulgaria hopes to see the country made a part of the Jugo-Slavic federation, and the matter was left to determination in the course of time. Bulgaria entered special claims in regard to territory, subject to decision by the League of Nations, after its organization.

Related Articles. Consult the following titles for additional information:
Balkan Wars
Serbia
Sofia
World War

BULL, a letter, edict or rescript of the Pope. It is published or transmitted to the churches over which he is the head, and contains some decree, order or decision. In many cases a leaden seal, impressed on one side with the heads of Saint Peter and Saint Paul, on the other with the name of the Pope, is attached to the bull. If the bull be a "Bull of Justice," the seal is attached by a cord of hemp; if a "Bull of Grace," the cord is of red or yellow silk. Pope Leo XIII ordered the use of ordinary instead of Gothic characters on the less important bulls.

BULL, JOHN. See JOHN BULL.

BULL, OLE BORNEMANN (1810–1880), a famous violinist, born at Bergen, Norway, who achieved great triumphs both in Europe and in America, chiefly on account of his wonderful technique, which probably has never been surpassed. Though self-taught, he gained by close study a thorough acquaintance with the old masters, and his interpretation of their works was unusually appreciative. Having lost all his money in a scheme to found a colony of his countrymen in Pennsylvania, he afterward settled near Cambridge, Mass., where he spent most of his later life. He died in Norway.

BUL'LARD, ROBERT LEE (1861–), an American military officer, one of the first corps commanders appointed under General Pershing on the organization of the American field army in France in 1918. Bullard was born in Youngsboro, Ala., and was educated at the Agricultural and Mechanical College of Alabama and at West Point Military Academy. After his graduation from the latter institution, in 1885, he was assigned to the Tenth Infantry, and subsequently served in the old commissary department. In the Spanish-American War he was colonel of the Third Alabama Volunteers, and after being mustered out, in August, 1899, was appointed colonel of the 39th United States volunteer infantry, which saw active service in the Philippines. Bullard was in action under General Pershing against the Moro tribes, and at this period

he had many narrow escapes from death.

In 1916 he served in Texas in connection with the border disturbances; in June, 1917, was appointed brigadier-general in the regular army, and the following month was made a major-general in the national army. In August, 1918, when the first American field army was organized in France, General Bullard was given command of the second corps, and he contributed materially to allied victory of the same year. He was raised to the rank of lieutenant-general for the duration of the war.

BULL'DOG, a variety of the common dog, having a short, broad muzzle and a projecting lower jaw which causes the lower front teeth to protrude beyond the upper. The head is massive and broad, the lips are thick and loosely hanging, the ears drooping at the extremity, the neck thick and short, the body long and stout, and the legs short and sturdy. The bulldog has a very obstinate nature, and when once it has fastened its teeth in an enemy it will hold on in spite of severe punishment. For this reason it is often employed as a watchdog and was formerly used in the barbarous sport of bull baiting. Bulldogs show great affection for their masters, but are liable to be surly and vicious with strangers. The *bull terrier* came originally from a cross between the bulldog and terrier. It is smaller than the bulldog, lively and very courageous.

BULLET, a projectile intended to be discharged from such firearms as a rifle, musket, pistol or revolver. The bullet made for the modern rifle is conical in shape; it consists of a copper core with a covering of nickel or steel. The size depends upon the caliber of the rifle used. Bullets made for revolvers are shorter and heavier, and are more dangerous in effect at short ranges than rifle bullets.

Dumdum Bullets, so called because they were first made at the Dumdum arsenal, in India, are missiles having an uncovered leaden core and a casing weak at the apex. Such bullets spread out on striking a bone, tearing the body and usually causing death. Their use is forbidden by the Hague warfare regulations. Bullets used for hunting, however, often have hollow points, to insure spreading when they strike the game.

BULL'FIGHTING, one of the favorite diversions of the Spaniards. The fights are usually held in an amphitheater having circular seats rising one above another, and are attended by vast crowds who eagerly pay for admission. The combatants, who make bullfighting their profession, march into the arena in procession. They are of various kinds—the *picadores,* combatants on horseback, in the old Spanish knightly garb; the *banderilleros,* combatants on foot, in gay dresses, with colored cloaks or banners; and lastly, the *matador* (the killer). As soon as the signal is given, the bull is let into the arena. The *picadores,* who have stationed themselves near him, commence the attack with their lances, and the bull is thus goaded to fury. Sometimes a horse is wounded or killed and the rider is obliged to run for his life.

The *banderilleros* assist the horsemen by drawing the attention of the bull with their cloaks and try to fasten on the bull their *banderillas*—barbed darts ornamented with colored paper, and often having squibs or crackers attached. If they succeed, the squibs are discharged, and the bull races madly about the arena. In case of danger they save themselves by leaping over the wooden fence which surrounds the arena. The *matador* now comes in gravely with a naked sword and red flag and aims a fatal blow at the animal. The slaughtered bull is dragged away and another is let out from the stall. During the season at Madrid there is at least one fight a week, and eight or more bulls are sacrificed in a single afternoon. It is not often that a man is injured. To one not accustomed to these fights, they are nerve-racking spectacles. It is said that King Alfonso of Spain fainted the first time he witnessed one.

BULL'FINCH, a cage bird which is valued because of its ability to reproduce a great variety of musical airs. Its body is a bluish-gray, with bright red on the breast. The crown of the head is black, as is also the short, thick, rounded bill. Bullfinches are found wild in Britain, Southern Europe and Asia. In Germany, especially, bullfinches are very popular, and trained birds command good prices.

BULL'FROG, a frog found in most parts of the United States and Canada, but chiefly abundant in the Southern states. It sometimes reaches a length of seven or eight inches, and is of an olive-green or reddish-brown color, with large brown or black spots and with a yellow line along the back. It receives its name from the remarkable loud-

ness of its voice, which is a hollow bass that can be heard distinctly for a long distance. The bullfrog inhabits swamp lands around lakes. In feeding it does not confine itself to insects and worms, as do the smaller frogs, but eats fish and other frogs and the young of birds and animals. The hind legs of the frog are often used as food and also as bait for fish.

BULLHEAD. See CATFISH.

BULLION, *bul'yun,* gold and silver in some form other than legal tender coin. The term may be applied to gold and silver bars, gold dust or nuggets, gold or silver plate, and to gold or silver coins of a foreign country—in fact, any form of these metals which may be taken to a mint and made into coins. A large proportion of the gold shipped from the United States is in the form of bars, and the vast gold reserves of the European banks are partly in this form.

BULL MOOSE PARTY. See PROGRESSIVE PARTY.

BULL RUN, BATTLES OF, two important battles of the Civil War, fought near Bull Run, in Northeastern Virginia. The first, occurring July 21, 1861, was the first important battle of the war. The Confederates, to the number of 31,000, were posted along Bull Run Creek. McDowell, who was commanding 28,000 Union soldiers, determined to attack their position, and he began by sending Tyler, Heintzelman and Hunter to turn the Confederate left wing. This movement was successful, but McDowell failed to follow up his advantage by occupying the strategic position at Manassas Junction, and chose to follow the fleeing enemy. After a time the Federals were repulsed by the forces of General Jackson, who there gained his sobriquet of "Stonewall." With the aid of reënforcements, Generals Joseph Johnston, Beauregard, Jackson and Kirby Smith directed a fresh attack and completely routed the Union forces. The second Battle of Bull Run, also known as the Battle of Manassas, occurred August 29 and 30, 1862, between an army of 40,000 men, under General Pope, and a somewhat smaller Confederate force under "Stonewall" Jackson. General Longstreet reënforced Jackson at nightfall, and on the following day the exhausted Union troops were compelled to retire, leaving the Confederates in possession of the field.

BULLS AND BEARS. See BEAR AND BULL.

BULL'S-EYE, a word used to denote three different things. They are:

1. A round piece of thick glass, convex on one side (see Lens), inserted into the decks, ports or skylight covers of a vessel, for the purpose of admitting light.
2. A small lantern with a lens in one side of it, to direct the light in any desired direction.
3. In shooting, the center of a target, of a different color from the rest of it and usually round. See Archery.

BULOW, BERNHARD HEINRICH, Prince von (1849–), a German statesman and diplomat, who held the office of Chancellor of the Empire for nine years following 1900. He was born in Holstein, where his family were people of considerable prominence. During the Franco-German War von Bülow served in the army, and subsequently held positions in the diplomatic service at Rome, Petrograd, Vienna and Athens. He was one of the secretaries at the Congress of Berlin, which followed the Russo-Turkish War of 1877–1878, and after further diplomatic experience became Secretary of State for Foreign Affairs. In 1900 he attained the Chancellorship.

Von Bülow's ability as a diplomat was conspicuously demonstrated during his service as Chancellor, especially in connection with the negotiations with France about Morocco (which see). He resigned the position, however, in 1909, because the Reichstag refused to accept his proposals for tax reforms. After a period of retirement he was recalled to public life by the outbreak of the World War. Appointed ambassador extraordinary to Italy, he sought zealously to keep Italy from joining the entente allies, but succeeded only in delaying Italian intervention. See WORLD WAR.

BULOW, HANS GUIDO VON (1830–1894), a pianist and composer, born at Dresden. He first studied for the law, but later he adopted music as a profession and studied the piano under Liszt. Bülow made his first public appearance in 1852, with only moderate success, but later became a leading figure in German musical circles. In 1855 he became leading professor in the Conservatory at Berlin, in 1858 was appointed court pianist and in 1867 musical director to the king of Bavaria. His most famous compositions include an overture and music to Shakespeare's *Julius Caesar,* an "orchestral ballad," *The Minstrel's Curse,* a symphonic

poem, *Nirwana,* and numerous songs, choruses and pianoforte pieces. He is considered one of the first of pianists and orchestral conductors.

BUL'RUSH, the popular name for almost any large, rushlike plants growing in marshes. A plant of this group provided material for the little boat that sheltered Moses. The name is most correctly given to a species of scouring rush or equisetum. See HORSETAIL RUSH.

BUL'WER-LYT'TON, EDWARD GEORGE EARLE, Lord Lytton (1803–1873), an English novelist, author of many popular stories, but best known for his brilliant *Last Days of Pompeii.* He was also a successful dramatist. From 1831 to 1841 and from 1852 to 1866 Bulwer was in Parliament, and he attained considerable influence. He was made a baronet in 1838, and raised to the peerage as Baron Lytton in 1866. Of Bulwer's plays, some of which have been very popular on the stage, the best known are *Richelieu, Money* and the *Lady of Lyons;* among his novels are *The Last of the Barons,* his greatest historical novel; *Rienzi, My Novel* and *The Caxtons.* Despite the affectations of Bulwer's style and of his sentiments, his books have always been popular because they have stories of interest to tell.

BULYEA, GEORGE HEADLEY VICKERS (1859–), a Canadian statesman, born at Gagetown, New Brunswick; educated in the grammar school of Gagetown and the University of New Brunswick. He went to Winnipeg in 1882 and the following spring to Qu'Appelle, Saskatchewan, where he engaged in business. He was elected to the Northwest Council in 1894 and for many years was a member of the Executive Council. In the territorial government he was commissioner of agriculture and of public works (1899–1905), and on the organization of Alberta as a province he was appointed lieutenant-governor (1905). After two terms in this office he became chairman of the public utilities board.

BUMBLEBEE, a large bee with a thick, hairy body, well known in most parts of the world but particularly numerous in the northern hemisphere, where often it reaches the Arctic regions. Bumblebees live in small colonies, where about half the bees are workers and the remainder males and females. They are not so orderly or perfect in their family life as the honeybees, as may be seen in the roundish, oval, scattered cells of different size found in a single nest. Bumblebees collect honey and store it, but at the end of the season the colony breaks up and only a few females survive. They are chiefly of value for the aid they render in the cross-fertilization of plants, and it is a curious fact that some species of clover cannot be grown successfully in countries where there are no bumblebees, for no other insect can fertilize the plants. Before Australia could become a clover-growing country its people were obliged to import great numbers of bumblebees.

BUMBLEBEE

BUNDESRAT, *boon'des raht,* the Federal Council of the German Parliament, before the dissolution of the German Empire in 1918, at the close of the World War. The Bundesrat was really a body of ambassadors, as it was composed of delegates sent by the individual states, considered as units. They voted in units, and as instructed by their respective states. A vote cast contrary to instructions was void. There were sixty-one members. See GERMANY, subhead *Government.*

BUN'GALOW, in India, a house or residence, generally of a single floor. The native bungalows are constructed of wood, bamboo or like material, but those of the Europeans are generally built of sun-dried bricks and have a thatched or tiled roof. They are often very elegantly and richly furnished and invariably are surrounded by a veranda, the roof of which serves as a protection against the sun, a necessary precaution in a hot climate.

In the United States the name is now commonly applied to houses of only one story, which of later years have become very popular. Inasmuch as the sleeping rooms and living rooms are all on the same floor, the bungalow is a very convenient form of home, but it is not always practicable when ground space is limited. In the article ARCHITECTURE may be found a picture of the exterior of a typical bungalow, together with a ground plan.

BUNION, *bun'yun*, an enlargement and inflammation of the joint of the great toe, arising from irritation of the small membranous sac located there. Bunions, which are usually caused by a tight shoe, begin in a small, tender spot, which swells and, if not cured, may become a very painful sore and cause a permanent deformity of the toe. Shoes that fit the foot are both a preventive and a relief, unless the bunion has been too long neglected. In serious cases bunions can be cured only through a surgical operation, which, though painful, is not dangerous.

BUNKER HILL, Battle of, the first important conflict in the struggle between England and the American colonies, fought on June 17, 1775. The British army of 10,000, under Generals Gage, Howe, Clinton and Burgoyne, was occupying Boston. The American army, 15,000 strong, was commanded by General Artemas Ward, with headquarters at Cambridge. Learning that the British intended to seize Bunker Hill, overlooking Charlestown, the Americans, during the night, quietly fortified the adjoining height, known as Breed's Hill. The British, discovering the redoubt at daybreak, opened fire from their ships of war in Charlestown Harbor. They finally landed a force and advanced upon the position of the Americans, but were repulsed with great loss. A second attack, during which Charlestown was burned, was no more successful. The British rallied for a third attack, and the Americans, after resisting with stones and the butts of their rifles, having exhausted their ammunition, withdrew. General Joseph Warren, one of the most prominent of the patriots, was among the killed. The loss of the British was about 1,000; of the Americans, 450.

BUNKER HILL MONUMENT

On June 17, 1825, Lafayette laid the corner-stone of Bunker Hill Monument, on the summit of Breed's Hill; and Daniel Webster delivered the oration of the day, making one of his greatest speeches. In 1843, when the monument was dedicated, the day's orator again was Daniel Webster. The cost of the shaft, over $125,000, was defrayed by popular subscription. The monument is of granite and is 221 feet high. At the top is a chamber reached by a spiral staircase.

BUN'SEN, Robert Wilhelm Eberhard (1811–1899), a German chemist who made valuable contributions to modern scientific progress. He invented the electric battery and burner (see below) that bear his name, discovered the method of spectrum analysis, and devised a means of making magnesium on a large scale. These are typical of a number of other Bunsen inventions and discoveries.

BUNSEN BATTERY, a form of galvanic battery, the cells of which consist of cleft cylinders of zinc, within which is a porous earthen cup containing a rectangular prism or a rod of carbon. The outer cup, in which the zinc is placed, contains dilute sulphuric acid, and the earthen cup contains nitric acid. This battery works quickly and generates a strong current, but it is now little used, because more convenient patterns have replaced it.

BUNSEN BURNER, a form of gas burner especially adapted for heating, consisting of a tube, in which, by means of holes in the side, the gas becomes mixed with air before burning, so that it gives a nonilluminating, smokeless flame producing intense heat. The principle of the Bunsen burner is very generally employed in homes for cooking purposes.

BUNSEN BURNER

BUNT, a disease of wheat, which is caused by the attack of a parasitic fungus. It is known also by the names smut ball, pepper brand and stinking smut. The diseased wheat takes on a bluish-green color and does not grow to its full height. The fungus is formed in the ovary of the wheat when the grain is young. It can do much injury to a crop, but can be prevented by careful selection and washing of the seed with water or solutions of copper sulphate, formalin or corrosive sublimate.

BUNT'ING, the popular name of a group of finches. In Britain the common bunting, or corn bunting is seen in most cultivated districts, and in the Artic regions the snow

bunting, or snowbird, is one of the few birds to be seen. In the United States the cowbird, or cow blackbird, is frequently called the cow bunting.

BUN'YAN, JOHN (1628–1688), an English writer, author of *The Pilgrim's Progress,* one of the world's masterpieces of allegory. He was the son of a tinker, and was born in the village of Elstow, near Bedford. He followed his father's employment, but during the civil war he served as a soldier, probably on the side of Parliament. Having joined, largely through the influence of his wife, a society of Baptists at Bedford, he at length undertook the office of public teacher among them, and this defiance of the severe laws against dissenters led to his arrest and to his imprisonment for twelve years (1660–1672). During a second imprisonment in 1675, Bunyan finished his famous *Pilgrim's Progress.* This book, a vivid, dramatic picture of the spiritual life of man, has, it is said, been translated into more languages than any other book except the Bible. Bunyan's other works, often overlooked by reason of the superior merit of *The Pilgrim's Progress,* include *The Life and Death of Mr. Badman, The Holy War* and *Grace Abounding,* an account of Bunyan's spiritual life.

JOHN BUNYAN

BUOY, *boo'y,* a floating object constructed of wood or iron and placed as a guide to navigation in rivers and harbors. There are a great many varieties of buoys, each constructed in the manner best suited to its particular purpose. For instance, the *can buoy* is an iron cylinder with a dome-shaped bottom. The *nut* or *nun* buoy is composed of two cones placed base to base. *Spar buoys* are merely wooden poles anchored and held upright by a heavy weight on their lower end. These are used where ice might destroy or carry away the can buoys. Some buoys are fitted with a lamp, which burns day and night; others carry bells which ring when the winds toss the buoy about, and still a third class is fitted with whistles, which are blown by air compressed and driven through them by the tossing waves.

Charts of harbors locate the buoys, and all navigators understand not only the location of each, but the special information which each buoy can give. For instance, in the harbors of the United States the buoys are painted black on one side and red on the other. As a ship enters the harbor it sails so as to keep the red sides of the buoys on the starboard side of the ship. Danger buoys are painted with red and black horizontal stripes; mid-channel buoys have black and white stripes running vertically; while the buoys that mark danger points are painted green. White buoys indicate safe anchorage.

BURBANK, LUTHER (1849–), an American plant breeder of world-wide reputation. For the greater part of his life he has specialized in plant improvement and the creation of new forms of trees, fruits and flowers, and he has achieved remarkable results. In the article following the reader will find an account of Burbank's methods and his more striking achievements.

He was born at Lancaster, Mass., received there a common school and academy education, and for a time worked in a factory in Worcester. As a boy he had been intensely interested in everything pertaining to nature, and it was inevitable that he should ultimately abandon factory life and devote himself to raising garden stuff and seeds. His first work in plant breeding was an experiment with potatoes, out of which grew the famous Burbank potato now raised by the millions of bushels. The climate of Massachusetts not proving adapted to the plans he had in mind, he journeyed to California, and in 1875 settled in a valley north of San Francisco. After a disheartening struggle he finally became the prosperous owner of a nursery business, and in 1893 was able to turn all of his energies to experimentation. At Sebastopol he has now a great experiment farm, the fame of which is international; Burbank and his family live eight miles distant, in a beautiful home at Santa Rosa.

Some Important Definitions. Luther Burbank has labored since he was less than twenty years of age to improve our useful and ornamental plants. Early he knew that a better plant demanded selection and segregation. *Selection* means guiding the changes in plant life by cutting off all those plants which are changing in undesirable ways, and reserving for reproduction only those which

LUTHER BURBANK

are better than the average. With these finer specimens the processes of planting and developing are continued. *Segregation* means keeping these more desirable plants away from the poorer specimens, so the latter may not influence the better specimens in their natural processes of reproduction. "Like produces like;" man never will be able entirely to change this man-made definition of Nature's laws, but by intelligent plant breeding we have already modified it to "Like produces like, or nearly like." Burbank does things according to the ways of Nature; he has taken things as he found them and at the end of patient years has yet the same thing, only larger, more beautiful, of greater value and utility, made so by the simple process of working with Nature.

The chief means by which Mr. Burbank reaches the results he seeks consist in producing new varities by *crossing*. By crossing is meant a mixing of races or kinds, or a mingling of the characteristics of different organisms. The resulting organism is called a cross, or, more commonly speaking, a *hybrid*. The general reader sees the word *hybrid* very frequently; it is easily understood in any connection in which it may be found if one simply remembers that a hybrid is a crossbred animal or plant—the offspring of the male of one variety or species with the female of another. Another word we must understand at this point is

Raise a Child Like a Rare Plant

In addressing a convention of teachers Luther Burbank summed up admirably the proper care of children, using as illustration plant life, which he knows so thoroughly. He said:

"Raise the child like a plant, care for it as you do for the rarest specimen of vegetation, bring it up in an atmosphere of love.

"If the child has but the smallest trace of some characteristic you desire to develop, take hold of it, care for it, surround it with proper conditions and it will change more certainly and readily than any plant quality," he declared with a fervor which left no room to doubt that from the fulness of his knowledge he knew what he said was true. This possibly is the keynote in the whole system of proper child rearing. Plant life is improved and quality is bettered by careful cultivation of desired characteristics. The same rule applies in training the child.

Mr. Burbank adds emphasis in the following lines, which serve to explain his last statement above:

"The child in nature and processes of growth is essentially the same as the plant, only the child has a thousand strings instead of but a few, as has the plant.

"Where one can produce one change for the betterment of the plant one can produce a thousand changes for the betterment of the child.

"Surround the child with the proper environment to bring out certain qualities and the results must come.

"Work in the same way as I do with the plant, and you will find the development of the individual is practically unlimited.

"I have taken the common daisy and trained it and cultivated it by proper selection and environment until it has been increased in size, beauty and productiveness at least four hundred fold.

"Do our educational methods do as much for our children? If not, where is the weakness?

"Not only would I have the child reared for the first ten years of its life in the open, in close touch with nature, a barefoot boy with all that implies for physical stamina, but would have him reared in love.

"I have taken the little yellow California poppy and by selecting over and over again the qualities I wished to develop have brought forth an orange poppy, a crimson poppy, a blue poppy. Cannot the same results be accomplished with the human?

"Is not the child as responsive?"

strain. A strain is a group of plants of the same variety which differs from the race to which it belongs, but differs only in improved physiological tendency, and not by any apparent characteristics.

Burbank's aim in crossing plants is to secure the combination of desirable qualities into one strain, and in the process eliminate undesirable characteristics. Many times only one crossing is necessary; in other instances many crosses are needed, during which processes many progeny appear which are valueless and must be destroyed. It is here that one must exercise great care in selection. Crossing is only one of the means of producing better varieties and species. Long continued and patient selection of the plants which nearest approach the quality desired must be continued until such quality is found in some individual plant. Then it is thereafter reproduced from seed, and all future growths which show a tendency to revert to inferior quality must be rigidly excluded until none but the type desired shall remain.

A Few Burbank Creations. The Burbank potato, the first fruit of his work as an investigator, has proved of great commercial value. It is discussed more fully in these volumes under the heading POTATO. In 1880 he began crossing blackberries, and of the various forms he produced none is more interesting than the white blackberry, with delicious pure white fruit (see BLACKBERRY). The seedless apple, the Shasta daisy, the spineless cactus, cobless corn and the stoneless plum are other notable Burbank creations, which the reader will find discussed under the headings APPLE, DAISY, CACTUS, CORN and PLUM. Of interest, too, are the pomato, which resembles a tomato but grows on a potato vine, the Burbank walnut, and the Burbank quince, which tastes like a pineapple. In 1918 he announced the production of a new variety of wheat which can be harvested at the rate of fifty bushels to the acre from the soil that formerly produced twelve bushels.

A World Benefactor. The average reader has doubtless considered Luther Burbank to be a theorist, a man lacking in practical lines of endeavor; but the foregoing brief account of his work should fully convince one that here is doubtless the most practical man who lives in the world to-day. It would be utterly impossible to estimate the added wealth which flows into the pockets of the farmers and fruit growers every year as a result of this patient man's development of our fruits and plants. Had he produced nothing during his whole life time of experiments other than the Burbank potato and the edible cactus, he would deserve an exceedingly high place in the memory of generations to come.

Consider the lowly potato, the drowsy poppy, the succulent plum, and the delicate blackberry; give thought to the cactus, the rose, the lily, all of which he has developed in directions that are marvelous—consider, in brief, almost any plant you choose, and if you follow the investigation carefully enough your study will lead your invariably to the door of a rose-covered cottage in Santa Rosa, California, Luther Burbank's home.

BURBOT, a fish of the cod family, found in the streams of the United States, England, Northern Europe and Asia. It never enters salt waters. The burbot is shaped somewhat like an eel, but is shorter, and has a flat head, with two small barbs on the nose and another on the chin. It is called also, *eelpout* or *coney-fish.* The *spotted burbot* is found in the American northern lakes and rivers. It is a coarse and tasteless fish, and is not valuable as food.

BURBOT

BURDETTE, *bur det'*, ROBERT JONES (1844–1914), an American clergyman and humorist, born in Greensboro, Pa. He attended public school at Peoria, Ill., and in 1862 joined the Forty-seventh Illinois volunteers, serving through the war. He wrote for several papers after the war and finally became associate editor of the *Hawkeye* of Burlington, Iowa, through which paper he became known as a humorist. He began to lecture in 1877 and ten years later became a licensed preacher in the Baptist Church. Among his books are *The Rise and Fall of the Mustache and Other Hawkeyetems* and *Chimes from a Jester's Bells.*

From original drawings, courtesy of Oscar E. Binner Co., Chicago, Luther Burbank's publishers.

SOME RESULTS OF LUTHER BURBANK'S EXPERIMENTS

1—Cobless corn. 2—Wonderful hybrid plum and its tiny parent; both natural size. 3—Shasta daisy and its parents; all natural size.

BUR'DOCK, a coarse weed with hooked flower heads which cling to animal hair and to the clothing of people. It is a common pest in the United States and Canada in those sections where cows and sheep graze. The burdock sometimes grows to be three feet high. It may be recognized by its large, roundish or heart-shaped leaves and prickly flowers. The plant is a biennial (which see), and cutting down does not destroy it; a more effective method of exterminating it consists in grubbing it up before the plant has a chance to bear seed. The large, thin leaves are sometimes used to make soothing poultices for inflammation, and in Japan the roots, young leaves and young shoots are used in soups.

BUREAU, *bu'ro*, a word of French origin now having two widely different meanings. The term is commonly applied to an article of bedroom furniture having drawers and a mirror, though the term *dresser* is also in general use for the same object.

According to its other meaning *bureau* means a department of government or a division of a department, as the Bureau of Education. *Bureau system*, or *bureaucracy*, is a term often applied to those governments in which the business of administration is carried on in departments, each under the control of a chief; or, more broadly, to the system of centralizing the administration of a country through regularly graded series of government officials.

BUREAU OF AMERICAN REPUBLICS. See PAN-AMERICAN UNION.

BUREAU OF CORPORATIONS. See FEDERAL TRADE COMMISSION.

BUREAU OF EDUCATION. See EDUCATION, BUREAU AND COMMISSIONER OF.

BUR'GLARY, the breaking and entering by night into the dwelling house of another, with intent to commit a felony. Every important word in this definition (from Coke) conveys a part of the meaning which distinguishes the offense of burglary from others known as *larceny* and *robbery* in the common law. Various American states and Canadian provinces have changed the definition of the crime by statute, so that it includes more than the above definition. The usual punishment is imprisonment, the maximum being rarely more than twenty years. The killing of a burglar in self-defense or in defense of family or property is not a crime. See FELONY.

BUR'GOMASTER, a German official whose duties are similar to those of the mayor of a town or city in England or America. The office is generally elective, but under the Empire if the government deemed it wise it might refuse to sanction the choice of the electors. This title occurs frequently in stories, plays and operas having a German background. The man who would become a burgomaster in a German city must qualify for the post by years of study.

BURGOYNE, *bur gawyn'*, JOHN (1722–1792), an English general of the Revolutionary War, whose surrender at Saratoga, in 1777, is generally considered the turning point in that struggle. After serving in various parts of the world, he was in 1777 appointed commander of an army against the Americans, and took Ticonderoga. A part of his army fought a battle at Hubbardton, a detachment of Hessians was defeated at Bennington, Vt., and on October 17 Burgoyne himself was forced to surrender with his whole army at Saratoga. He was coldly received on his return to England and deprived of his command. Latterly he occupied himself with the writing of comedies, including the *Maid of the Oaks*, *The Lord of the Manor* and *The Heiress*, a play that still holds the stage.

BUR'GUNDY, a French territory which figured prominently in European history in the Middle Ages. In 933 the northwestern portion became a separate duchy, subject to the French crown and governed by a line of dukes from the House of Capet, which became extinct in 1361. Dating from the accession of Philip the Bold, the territory and power of Burgundy constantly grew and increased in importance. On the death of Charles the Bold in 1477 the duchy was seized by Louis XI, king of France, and annexed to France. The old Burgundy forms the modern departments of Côte-d'Or, Saône-et-Loire and Yonne, part of Ain and part of Aube. The chief towns are Dijon, Auxerre, Chalon-sur-Saône and Macon.

BURGUNDY WINES, wines produced in the former province of Burgundy, especially in the Department of Côte-d'Or. In richness of flavor and all the more delicate qualities of the juice of the grape, they are inferior to none in the world. See WINE.

BURIAL, *ber'e al*, the mode of disposing of the dead. Different peoples adopt methods of burial. The savage races expose the

bodies to wild animals or to birds of prey; the Hindus throw their dead into the Ganges River. However, the two most common methods have been interment and burning. Both forms were practiced among the Greeks and Romans, though burning, or cremation, came to be almost the sole method during the later years of the Republic. The method of interring has varied; in some cases, as with the early Babylonians, the bodies were placed on the surface of the ground and mounds were raised over them, while in other cases deep graves were dug, or elaborate buildings constructed, to contain the urns or coffins in which the bodies were sealed. Among civilized nations of to-day cemeteries are set apart, in which the bodies are buried, as after the introduction of the Christian religion the practice of cremation (which see) almost entirely disappeared. Latterly, however, it has been revived, and it is undoubtedly a more sanitary method, since it is certain that in many cases the hillside cemetery proves a source of contamination to the water supply of town and city. See CREMATION; EMBALMING.

BURKE, EDMUND (1729–1797), a noted British writer, orator and statesman, who applied himself both to literature and to law, though chiefly the former. In 1756 he published his essay *On the Sublime and Beautiful,* which procured him the friendship of some of the most notable men of his time. The great question of the right of taxing the American colonies was then occupying Parliament, and while Burke was a member for Bristol he made several wonderful speeches in which he criticised the measures of the ministry with regard to the colonies and advocated a policy of justice and conciliation. His speech *On Conciliation with America* is one of the finest examples of argumentative oratory in existence, and is widely studied in high schools as a model of logical writing.

In 1782 Burke was made paymaster-general of the forces, and after the change of Ministry in 1783 he took an active part in the famous impeachment trial of Warren Hastings. The clearness and eloquence of his oratory and his remarkable mastery of detail in the consideration of this case have never been surpassed. In his later struggles to combat the ideas and doctrines of the French Revolution he was separated from the Liberals and his old friend Fox, and from this time on until his withdrawal from Parliament in 1794 he was a consistent opponent of Revolutionary ideas.

BUR'LAP, a heavy cloth made from flax, hemp and other fiber plants, which in recent years has become popular interior decoration. Plain and decorated burlap may now be seen in artistic homes, serving as wall coverings, cushion tops, hangings, etc. Originally burlap was considered suitable only as a material for sacks or for packing. The undyed fabric is an ugly shade of tan.

BURLEIGH, *bur'li,* LORD. See CECIL WILLIAM.

BURLESQUE, *bur lesk',* a literary composition which excites laughter by its travesty of some other work or by a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in commonplace language; high sounding words may be used to describe insignificant thoughts or facts. The most famous of the early writers of burlesque in England was Chaucer, who ridiculed some of the bombastic and long drawn-out tales of the Middle Ages. *Don Quixote,* the most famous example of this class of works, was originally intended as a burlesque on the absurdly romantic tales of chivalry. As a form of the drama, burlesque was well known to the Greeks, and it has persisted steadily wherever dramatic forms have been cultivated. The dramas of W. S. Gilbert contain the strain of burlesque in their travesty of fads and affectations, but at present the burlesque means rather a mixture of travesty, vaudeville and ballet. The most modern burlesque, as presented in large cities, sometimes approaches the obscene.

BUR'LINGAME, ANSON (1820–1870), an American statesman who negotiated, in 1868, the treaty known by his name, between the United States and China, by which the latter first subscribed to the principles of international law. He was graduated in law at Harvard in 1846, began to practice at Boston, became a state senator in 1853, entered Congress in 1854 and remained there until March, 1861. In 1856 he was challenged by Preston S. Brooks, whose brutal assault upon Charles Sumner he had denounced in scathing terms. The duel was never fought. Burlingame was sent in 1861 as United States minister to China, and when he was recalled, in 1867, the Chinese government engaged his services as its diplomatic representative in Europe and America.

BURLINGTON, Iowa, situated on the west bank of the Mississippi River, 206 miles southwest of Chicago, is the county seat of Des Moines County. The river commerce is extensive. It was settled in 1832, named in 1834 for Burlington, Vt., and incorporated as a city in 1837. It is served by the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Toledo, Peoria & Western and the Muscatine North & South Railroad companies. There are three parks, containing eighty-six acres. The shops of the C., B. & Q. Railroad are here, and there are engine works, candy factories, wood-working shops and numerous wholesale houses. The city has a public library, three hospitals and six banks. The commission form of government was adopted in 1910. Population, 1910, 24,324; in 1917, 25,144 (Federal estimate).

BURLINGTON, N. J., eighteen miles north of Philadelphia, is on the Delaware River and the Pennsylvania Railroad. It is a manufacturing town, and produces structural steel, stoves, shoes, iron pipe, silk, canned goods, carriages and harness.

The town is old, having been settled in 1677 by Quakers from London and Yorkshire, under the name New Beverly. Later it was called Bridlington. For several years before 1700 the New Jersey legislature met alternately at Trenton and Burlington. A city charter was secured in 1733, and this was replaced by a new one in 1784. During the Revolution it received the fire of the British on several occasions. The town has a private school for girls. Population, 1910, 8,336; in 1917, 9,024 (Federal estimate).

BURLINGTON, Vt., settled in 1763 and chartered as a city in 1865, is the largest city in the state and county seat of Chittenden County, on the east shore of Lake Champlain, and on the Rutland and Central Vermont railroads. It is at the head of the New York State Barge Canal system. The University of Vermont (see Vermont, University of) and the State Agricultural College are here, and there is a notable library building. Because it is the state's educational center there are more institutions of learning here than in most cities of like size. The harbor is large, and the commerce with other ports is extensive; there are especially large lumber interests, principally in timber from Canada. In the vicinity are marble and limestone quarries. Population, 1910, 20,464; in 1917, 21,802 (Federal estimate).

BURMA, the largest and most eastern province of British India, extending northward and eastward from the Bay of Bengal to the limits of Assam, Tibet, China and Siam. Its area is about 231,000 square miles, over twice that of the Philippine Islands, and it has a population of more than 12,000,000. The capital is Rangoon, the fifth in population among the cities of British India (293,316). Mandalay, with 138,299 people, is celebrated through Kipling's ballad, *On the Road to Mandalay,* and is the second city of the province.

Burma is a hilly or mountainous country, for the most part, with the highest elevation in the north, where a spur of the Himalayas separates the country from Tibet. Chief among several rivers which flow through the mountain valleys is the Irrawaddy, flowing in a southern direction through the central portion. It drains three-fourths of the country, and its wide delta is a region of great fertility. The eastern part of Burma is drained by the Salwin.

Agriculture is the leading industry. The land is leased from the state, the rent constituting an annual tax. The principal products are rice, oil seeds, cotton, tobacco, sugar cane, tea and indigo. Rice is by far the most important product, and Burma is the leading country of the world in its production. Manufactures are few and limited and consist principally of the weaving of silk and cotton textiles. Some of the inhabitants are skilful workers in wood and gold, and their products are of considerable artistic value.

Railways extend from Rangoon to Mandalay, and from Rangoon to Thayetm-yo and other important towns. The Irrawaddy is navigable, and there are three canals connected with it. Since the British occupation the carriage roads have been greatly improved. The commerce consists of the exportation of rice and other agricultural products, and the importation of textiles, metals and other manufactured products. A considerable part of the foreign trade is with Great Britain and China.

The country is governed as a province of British India. The chief executive officer is a lieutenant-governor, and he is assisted by a legislative council. For local administration the province is divided into eight divisions, each in charge of a commissioner. By far the larger portion of the inhabitants are Buddhists. The remainder are divided among Mohammedans, spirit worshipers and Christians. Most of the inhabitants are native Burmese and belong to the Mongolian branch of the human family. The eastern highlands are inhabited by the Shans, and the hills to the north by the Karens, who still retain the habits and customs of the aboriginal tribes. The Burmese language is spoken, and the people have considerable literature, which is increased yearly by the publication of a number of books.

BURNE-JONES, Edward, Sir (1833–1898), an English painter, one of the associates of Rossetti in the group known as the Pre-Raphaelites, who favored a return to the sincerity and purity of art that existed before the time of Raphael. He painted in water color as well as oil, and his works are remarkable for richness of coloring as well as for poetic feeling. His subjects are from many sources—from the Bible, from Christian and heathen story and from the legends of King Arthur. Among his best known works are *Hope*, *Venus's Mirror*, *The Golden Stair* and *Wine of Circe*. Burne-Jones was made a baronet in 1894.

BUR'NET, the popular name of two plants of the rose family. Both are common in Europe, where they are cultivated on dry soils as fodder plants. The smaller plant has been introduced into America, and now grows wild in Northeastern United States and Canada. It bears reddish-green flowers arranged in closely packed heads. The leaves are slightly astringent and are sometimes used in soups and salads as flavoring.

BURNETT', Frances Eliza Hodgson (1849–), an American writer, widely known as the author of many interesting and well-written novels and of one of the most popular children's stories ever published. The latter—*Little Lord Fauntleroy*—started a new style in boys' clothing, and in dramatized form it was for years a favorite among children's plays. Mrs. Burnett is English by birth, but during most of her literary career has resided in the United States. In 1873 she married Dr. L. M. Burnett, and though she was divorced from him in 1898 she continued to use his name professionally. Her second husband, Stephen Townsend, who collaborated with her in some dramatic writing, died in 1914.

Mrs. Burnett first won an assured place in literature in 1877 with the publication of *That Lass o' Lowrie's*, a stirring tale of English mining life. She wrote industriously thereafter, producing, among other stories, *Haworth's*, *Louisiana*, *A Fair Barbarian*, *Little Lord Fauntleroy*, *Editha's Burglar*, *A Lady of Quality*, *Sara Crewe* (a child's story), *The Pretty Sister of José*, *A Little Princess*, *The Shuttle* (all three dramatized for the moving picture stage), *The Dawn of Tomorrow*, *T Tembarom* and *The Lost Prince* (1915). The stage version of *The Dawn of Tomorrow* was one of the great popular successes of the day, and the rôle of Glad, played by Eleanor Robson, gave that gifted actress one of the best opportunities of her career.

BURNHAM, *burn'am*, Daniel Hudson (1846–1912), an American building designer who first became widely known through his work as architect for the World's Fair at Chicago (1893). He is also famed as the designer of the Masonic Temple, Chicago's tallest skyscraper, the Marshall Field retail store, the largest in the world, New York's famous Flatiron Building, and the Selfridge department store, in London. Burnham was born in Henderson, N. Y., and was educated in Chicago and in Massachusetts. In 1872, the year after the great Chicago fire, he established a business in the ruined city, and he had a prominent part in its rebuilding. Years later he designed the "Chicago Plan" for making that city one of the finest in the world, but died before he saw more than a mere beginning of his plans. Burnham was a member of the committee for the beautifying of Washington, D. C. (which see), and the artistic Union Station of that city is his production.

BURNHAM, Sherburne Wesley (1838–), an American astronomer who has been remarkably successful in discovering and cataloguing double stars. He was born at Thetford, Vt., and was educated in Thetford Academy. He began life as a stenographer, and while practicing stenography he took up the study of astronomy as a recreation and became deeply interested in it. He soon ac-

quired remarkable skill for an amateur, and in 1876 he became connected with the Chicago Observatory. From this position he went to the Lick Observatory, when that was opened, and on the opening of the Yerkes Observatory he was appointed professor of practical astronomy in the University of Chicago. Burnham published a catalogue of stars discovered by him from the founding of the Yerkes Observatory to 1900.

BURN'ING. See COMBUSTION.

BURNING GLASS, a lens having both surfaces curved outward, so that it is thick in the center and thin at the edges (see LENS). When the sun's rays pass through such a lens, they are all brought to a point called the focus. The heat at the focus is sufficient to set on fire wood, paper and similar substances. Glass globes when filled with water and set in the sun act as burning glasses and may cause serious damage. For the story of burning glasses that set fire to a fleet, see the article ARCHIMEDES.

BURN'LEY, ENGLAND, a city on the River Brun, at its junction with the Calder, twenty-nine miles north of Manchester. The place has well-planned streets and excellent buildings, most of which are constructed of stone. The important structures are the townhall, an exchange, a market hall and several churches. The city also has a mechanics' institute, a technical school, a grammar school, numerous public schools and Victoria Hospital. The leading manufactures are cotton and worsted goods and foundry products, and there are machine shops, collieries and quarries in the vicinity. The waterworks, gas and electric light plants, public markets and slaughter houses are owned by the municipality. Population, 1911, 106,337.

BURNS, JOHN (1858–), a British labor leader and advocate of Socialistic doctrines. He was born of poor parents, and became a laboring man. In his youth he read extensively along radical lines, and by the time he was twenty he was well known in laboring circles. Several times he was arrested for speeches that were said to be provocative of violence; it is an interesting fact that on one occasion he was defended by a young lawyer named Asquith, who later became Prime Minister. In 1889, while he was an employe in the Hoe press shop, Burns was elected to the London County Council, and three years later he was sent to Parliament as a member for Battersea. His constituents have since then retained him as their representative. In the Cabinets of Campbell-Bannerman and Asquith, Burns held the position of President of the Local Government Board, being the first Socialist to hold a seat in the British Cabinet. In 1914 he was President of the Board of Trade, but resigned this position on the outbreak of the World War, because he opposed England's taking part in it.

His birthplace

BURNS, ROBERT (1759–1796), the chief lyric poet of Scotland, whose poems are read and loved in many lands. As Tennyson and Browning are poets of the educated classes, so Burns is the spokesman of the man of the soil—"the peasant's poet."

"Bobbie Burns," as the Scotch call him, was born near Ayr, January 25, 1759. His father, a gardener, and latterly a small farmer, was very poor, but did the best he could to educate his children. Robert was instructed in the ordinary branches by a teacher engaged by his father and a few neighbors. To these common branches he afterward added French and a little mathematics, but most of this education was obtained from general reading, to which he devoted himself earnestly. In this manner he learned what the best English poets might teach him and cultivated the instinct for poetry which was a part of his nature. At an early age he had to assist in the labors of the farm; and when only fifteen years old he had to do the work of a man. In 1781 he went to learn the business of flax dresser at Irvine, but the premises were destroyed by fire, and he was forced to give up the scheme. His father died in 1784, and Robert took a small farm, Mossgiel, which he worked with his younger brother, Gilbert. He began to write poems which attracted the notice of his neighbors and gained him considerable reputation with literary men. This is not strange when we consider that such poems as *The Cotter's Saturday Night, To a Mouse* and *The Jolly Beggars* were produced at this time.

An unhappy love affair with Jean Armour of Mossgiel made him decide to emigrate to

Jamaica. To obtain the funds necessary for the voyage, he published by subscription a volume of his poems, in 1786, but as he was about to set sail from his native land, he was drawn to Edinburgh by a letter from an eminent man there, recommending that he should take advantage of the general admiration his poems had excited and publish a new edition of them. This advice was eagerly adopted, and the books sold far better than he had dared to hope. After remaining more than a year in Edinburgh, admired, flattered, and received in the highest society, Burns retired to the country with about $2,500, which he had realized by the second publication of his poems. A part of this sum he advanced to his brother, and with the remainder he took a farm at Ellisland, near Dumfries. In 1788 he was appointed to the office of exciseman, and his duties were conscientiously performed. He married Jean Armour in 1788. It was during his residence on this farm that he wrote, in a single day, *Tam O'Shanter*.

ROBERT BURNS

The farming at Ellisland was not successful, and in about three years Burns removed to Dumfries and relied on his employment as an exciseman alone. He continued to write, however, and composed a number of beautiful songs adapted to old Scottish tunes. But his residence in Dumfries, and the society of the idle and the dissipated who gathered around him there, attracted by his brilliant wit, had an evil effect upon Burns, whom disappointment and misfortunes were now making somewhat reckless. In the winter of 1795 his health, strained by cares and dissipations, began to give way; and in the following summer he died. He left a wife and four children, for whose support his friends and admirers raised a subscription.

Burns was an honest, proud, friendly, warm-hearted man, combining sound understanding and a vigorous imagination with the high passions which were his misery and ruin. His poetry, at its best, when written in the Scottish dialect rather than in formal English, is marked by a tenderness, a simplicity, and a close touch with life, which give him rank among the greatest poets.

BURNS AND SCALDS, are injuries produced by excessive heat on the human body. They are generally dangerous in proportion to the extent of surface they cover. Congestion of the brain, pneumonia, and inflammation of the bowels or kidneys are diseases which may follow an extensive burn. Pneumonia usually results from irritation of the lungs and bronchial tubes through the inhaling of smoke or steam. Inflammation of kidneys or bowels is liable to result from a bad burn which destroys considerable skin and prevents it from performing its work of excretion; the bowels and kidneys become overworked as a result. In case of serious accidents, shivering and exhaustion are liable to occur. In such case the patient should be made comfortable and be kept quiet, and those in attendance should see that he is kept warm and given plenty of fresh air.

Local treatment of a surface burn consists in excluding the air by covering the injured part with vaseline, cream, lard or other grease. Be sure that whatever is used is clean. If there is time, it is a good idea to heat the grease and then to cool it before using. Carron oil, made of equal parts of lime water and raw linseed oil, is a good remedy, but it must be free from germs. Burns from acid should be treated with lime wash made of lime mixed with water, soapsuds or milk of magnesia. For alkali burns use vinegar, lemon juice or hard cider.

BURNSIDE, Ambrose Everett (1824 1881), an American military leader who bore a prominent part in the Civil War. He was graduated from the military academy at West Point in 1847 and went to Mexico as second-lieutenant of Third Artillery. At the beginning of the Civil War he took command of a regiment from Rhode Island, and in 1862, as commander of the Department of North Carolina, he captured the Confederate garrison on Roanoke Island. He was then transferred to the Army of the Potomac. His force held, with great loss of life, the stone bridge at Antietam, which was the important post of the battle, and when, after that battle, General McClellan was relieved, Burnside took the command.

GENERAL BURNSIDE

After the disastrous Battle of Fredericksburg he was superseded by Hooker and transferred to the Department of the Ohio. During 1864 and 1865 he served under Grant and took part in all the important battles. After the war he was governor of Rhode Island from 1866 to 1869, and from 1875 to his death was in the United States Senate.

BURR, AARON (1756–1836), an American statesman who figured in a sensational plot against his country during its early history. He was born at Newark, N. J. Burr was a graduate of Princeton College, of which his father and grandfather (Jonathan Edwards) had been presidents. In 1775 he joined the patriot army, where he gained a high reputation, rising to the rank of lieutenant-colonel. Retiring in 1779, he was admitted to the bar, soon became a leader in his profession, was elected attorney-general of New York and in 1791 United States Senator.

In 1800 he was a candidate for President of the United States, and received the same number of electoral votes as Jefferson, but the House of Representatives, chiefly through the influence of Hamilton, elected Jefferson, and Burr became Vice-President. This disappointment, and a subsequent defeat in a contest for the governorship of New York, which he also attributed to Hamilton's influence, with good reason, led him to force a duel upon his great rival. The meeting took place at Weehawken, not far from New York City, July 11, 1804. At the signal, Hamilton fired into the air, but he fell mortally wounded at Burr's first shot.

Burr, branded a murderer by the people, fled to South Carolina, and though indicted for murder, returned after the excitement had subsided and completed his term as Vice-President. But his political prospects in the United States were destroyed, and he therefore prepared to raise a force to conquer Texas, establish there a republic, with himself at its head, which might detach the Western states from the Union and give him vengeance for past injuries and failures. His scheme had progressed to an advanced stage, when the enterprise was detected, and Burr was tried for treason (1807). Though acquitted, his reputation was ruined. He spent some wretched years in Europe, and in 1812 returned to his law practice in New York. Here, shunned by society, he died on Staten Island.

BURROUGHS, *bur'roze*, JOHN (1837–), an American naturalist and essayist, whose observations on plant and animal life are widely read and loved by young and old. He was born in New York, the son of a farmer, and his youth was spent partly in farm work. After teaching for a time and holding various government positions, he withdrew to his New York farm, where he devoted himself to nature study, fruit culture and writing. His style is of the intimate and personal kind, easy and familiar, and as he has written largely on nature subjects he has helped others to gain a better appreciation of insect, bird and flower life. His works are remarkable not only for the accuracy of observation shown in them, but for the ability which he possesses to transfer to his readers his own interest in his subjects.

JOHN BURROUGHS

Locusts and Wild Honey, Pepacton, Wake Robin, Sharp Eyes, Far and Near and *The Ways of Nature* are books of essays on rural subjects, while *Whitman: a Study, Literary Values* and *The Light of Day* show his interest in general literature. Many of his papers were written at *Slabsides,* the rustic house which he built for himself on his little celery farm at Esopus, about a mile from the Hudson River. In 1903 Burroughs traveled through the western part of the United States with President Roosevelt; *Camping and Tramping with Roosevelt* contains an account of these travels. Among other works are *Leaf and Tendril,* a volume of essays; *Bird and Bough,* a volume of poems; *Time and Change, The Summit of the Years* and *The Breath of Life.*

BURYING BEETLE, the name of a genus of common insects that have a very keen sense of smell, which guides them to small dead animals, around and under which they burrow until the bodies are covered by the ground, sometimes to a depth of six inches. In these carcasses the beetles lay their eggs, and the young larvae, which hatch in less than a fortnight, find plenty of food awaiting them. There are ten distinct American species.

BUSHEL, a measure of capacity in the English system of weights and measures, used chiefly for measuring dry quantities. The standard bushel in Canada and the United States contains 2,150.42 cubic inches, being equal to a cylinder 8 inches deep and 18½ inches in diameter, interior measure. It is about equivalent to 35.24 liters. In Great Britain an *imperial bushel* is also used, having a capacity of 2,218.192 cubic inches. A bushel is divided into 4 pecks, each peck into 8 quarts, each quart into 2 pints, each pint into 4 gills. It is also sometimes divided into 8 dry gallons.

BUSH'MEN, a race of people who dwell in the western part of South Africa, in the immense plains bordering on the north side of the Cape of Good Hope. They are among the most degraded races of the world. They unite only for defense or pillage, have no established homes and do not cultivate the land, but support themselves by hunting. Their language is exceedingly primitive, consisting only of a certain clicking with the tongue and harsh, gurgling tones, for which we have no representation. They are now under the control of the British government.

BUSINESS COLLEGE, a school devoted to training young men and women in commercial work. Such schools are the response to a demand for practical training in business such as public schools did not attempt to furnish until within recent years. Even to-day only the larger cities have public-school courses in business subjects. The courses of the best colleges now include instruction in commercial arithmetic, a thorough system of accounts, including banking and commission, shorthand and typewriting, commercial law and at least one modern language.

The business colleges in the United States are presumed to be the outgrowth of the work of Mr. R. M. Bartlett of Cincinnati, who in 1846 began to give instruction in bookkeeping and other commercial subjects to private pupils. By 1860 all leading cities of the country contained one or more business colleges, and since that time their number has greatly increased. There are now few cities of 5,000 people that do not have one or more schools of this class. For a number of years these schools possessed no special text-books, but as they increased in number and patronage special texts were provided. The development in all lines of industry has made it necessary for the business colleges to extend their courses of study and provide instruction in a large number of branches.

BUST, in sculpture, a representation of the head and upper part of the body. This form of sculpture was practiced by the Greeks as early as the sixth century B. C. It is shown in the Hermae, heads of Hermes mounted on pillars and erected along the roads to serve as guideposts. During the literary period of Greece, portrait busts came to be an important form of sculpture, and there remain to us to-day faithful likenesses of such men as Socrates, Demosthenes, Plato and many others. There have also been preserved a large number of Roman busts. After an interval of several centuries, bust portraiture was revived late in the Middle Ages, and has continued to be an important field for the sculptor.

BUS'TARD, a game bird, of which there are several species found in Europe and Africa. The head is flat, the neck thick, and the bill somewhat blunt and depressed. This bird is now rare in Britain, but it is found in the southern and eastern parts of Europe and on the steppes of Tartary. The largest species weighs twenty-five or thirty pounds. Bustards can all run very rapidly, but they take flight with difficulty. Their food consists chiefly of juicy plants, though they eat earthworms and insects.

BUTCHER BIRD. See SHRIKE.

BUTLER, BENJAMIN F. (1818–1893), an American lawyer, politician and general, born at Deerfield, N. H., and educated in Maine. He practiced law in Lowell, Mass., became prominent in his profession and was elected to the legislature, where he urged labor reforms.

BENJAMIN F. BUTLER

He was appointed brigadier-general of the state militia at the outbreak of the Civil War, became major-general of volunteers in May, 1861, and was given command of the Department of Eastern Virginia, where he made a failure of an important expedition. The following March he commanded an expedition sent to New Orleans, and from May to December commanded the

city, arousing intense antagonism among the citizens by his arbitrary conduct. President Davis issued a proclamation declaring him to be an outlaw. In 1863 he was placed in command of Virginia and North Carolina, with the Army of the James. In an attempt to capture Richmond by operations from the south side of the James, he was checked by General Beauregard. Later he was sent to Fort Fisher, N. C., but he was removed from command by General Grant. He then returned to Massachusetts, where for many years he was active in politics. In 1884 he was the Greenback-Labor candidate for President.

BUTLER, Ellis Parker (1869–), an American humorist, born in Muscatine, Iowa. He is known principally as the author of *Pigs is Pigs,* probably the most ludicrous book ever produced in America. Other books of a similar nature include *The Incubator Baby, The Great American Pie Company, The Cheerful Smugglers* and *Adventures of a Suburbanite.* Somewhat longer than these is his *Jack-Knife Man,* published in 1913. Still later books from his pen are *Red Head* and *Dominie Dean.*

BUTLER, Nicholas Murray (1862–), an American educator, born in Elizabeth, New Jersey. He was educated at Columbia College and after graduation took special courses in Berlin and Paris. Following his studies abroad, he was appointed assistant in philosophy at Columbia. He founded and was the first president of the New York College for the training of Teachers, an institution which has since been incorporated into Columbia University. It was through his influence, while a member of the state board of education of New Jersey, that manual training was introduced into the public schools of that state. In 1902 Dr. Butler was elected president of Columbia University, to succeed Seth Low, who had been elected mayor of New York. He has taken an active interest in state politics, and in 1912, after the death of James S. Sherman, his name was placed on the Republican ticket (Taft, for President) as the nominee for Vice-President.

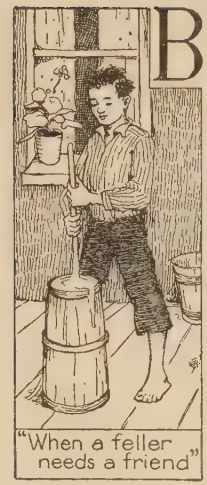
Dr. Butler is the editor of *The Educational Review, The Teachers' Library,* the Great Educators series, the *Columbia University Contributions to Philosophy and Education* and *Monographs on Education in the United States.*

BUTLER, Pa., founded in 1798 and incorporated in 1803, is the county seat of Butler County, and is located thirty-one miles north of Pittsburgh. It has four railroads—the Buffalo, Rochester & Pittsburgh, the Bessemer & Lake Erie, the Pennsylvania and the Pittsburgh & Western. The industries center largely in coal, iron, oil and gas. There is a large steel car manufactory, also important glass works; industries not so extensive are manufactories of silk, pearl buttons, beds and white lead. There is a public library, a hospital and a courthouse. Population, 1910, 20,728; in 1917, 27,632 (Federal estimate).

BUTLER COLLEGE, at Indianapolis, is a coeducational institution, chartered in 1849 as the Northwestern Christian University by the Disciples of Christ. The present name was adopted in 1896. There are a college of liberal arts, schools of music and art and a theological course. Attendance, 550 students.

BUTTE, *bute,* an isolated hill or mountain rising abruptly above the surrounding country. Buttes abound in the Rocky Mountain region; many of them have been formed by the erosion of ancient plateaus, and they are prominent features in the landscape. The situation of the largest city in Montana in a region of this nature gave the place its name of Butte. The term is also applied to high mountains, though it is not generally so used in the United States. See Plateau.

BUTTE, *bute,* Mont., founded in 1864 and named for Big Butte, (see Butte), west of the city, is the county seat of Silver Bow County and the metropolis of the state. It is seventy-two miles southwest of Helena and twenty-five miles southeast of Anaconda. Four railroads—the Northern Pacific, the Chicago, Milwaukee & Saint Paul, the Oregon Short Line and the Butte, Anaconda & Pacific—enter the city. Mining interests are dominant; copper is the most important product of the labor of 12,000 miners locally employed. There are 150 mines in the vicinity in active operation. Besides copper, there is found gold, silver, lead and zinc. Over $1,000,000 a week results from mining, and the monthly mining payroll is $2,000,000. There are six banks, a number of large commercial buildings, a library, three hospitals and the important Montana School of Mines. Population, 1910, 39,165; in 1917, 44,057 (Federal estimate). In the city and vicinity there are fully 80,000 people.


"When a feller needs a friend"

BUTTER, a very essential dairy food, made from the fat of milk. It was formerly derived from the milk of goats and sheep, but cow's milk is the source of practically all butter found on the market to-day.

How Made. In England and some other countries butter is occasionally made by churning the new milk, but it is usually obtained by churning the cream. The first step in the process is separating the cream from the milk. This is done by setting the milk in a cool place in shallow dishes, by placing it in deep cans which are immersed in cold water, or by the cream separator. In large modern dairies the separator process has replaced the other methods, as it saves time and secures a larger proportion of the cream. The cream may be churned while it is sweet or it may be allowed to stand until it becomes slightly sour, or ripens. The ripened cream is usually preferred, since it gives butter of a better flavor. Artificial "starters" made of sour skim milk or prepared ferments are sometimes used, as they protect the ripening cream from undesirable germs that are liable to appear in cream left to ripen. While being churned the cream should be kept at a temperature of from 50° to 65° F.

Churning simply gathers the particles of fat together and separates them from the buttermilk. After the churning, the buttermilk is drawn off, the butter is washed and then worked, for the purpose of expelling any remaining milk or water that it may contain, and for absorbing the necessary quantity of salt. The working is done either by hand or in a machine called the butter worker. In creameries churning and butter working are all done by machinery. In home dairies they are usually performed by hand labor.

Qualities and Composition. The natural color of butter is golden-yellow, but a darker color does not necessarily indicate an inferior quality. Butter made in the spring and early summer, when the cows have fresh grass to graze upon, is generally darker than that made later in the year. Artificial coloring matter is sometimes used to insure uniformity of color; the dyes employed most commonly are annatta, turmeric, saffron, marigold leaves and carrot juice. A good butter has a distinctive flavor, is free from disagreeable odors, is firm, and can be spread readily. A greasy feel or oily taste is not desirable. In America an ounce of salt is ordinarily used for one pound of butter, but European butters as a rule have a smaller proportion of salt.

A Test for Purity. Butter ranks high in nutriment, since standard qualities contain eighty-three per cent of fat or more. In the United States butter having a fat percentage below 82.5 and a water percentage greater than 16 is considered below standard. Pure butter is recommended as a part of a well-balanced ration. Care should be taken to serve only a pure product; there is a simple test by which any housewife can discover whether or not she has been sold a butter free from artificial fats. Melt a bit of the butter to be tested in warm (not hot) water. Keep it at an even temperature for half an hour. If pure it will show clear at the end of that time; if it contains artificial fat it will be cloudy. Also, if a little pure butter be heated in a spoon over a flame it will simmer quietly. If butter sputters and pops under such a test it has artificial fats in it. Oleomargarine (which see) is a butter substitute that has many things in its favor, but it should never be sold for the genuine product.

Production. In proportion to its size, Denmark leads the other countries of the world in butter output, but in actual amount produced the United States is first. Wisconsin, Minnesota, Iowa, Illinois, New York, Pennsylvania, Michigan and Ohio are leading butter states; the yearly output for the whole country is about 1,700,000,000 pounds, valued at over $405,000,000. Canada produces about 205,000,000 pounds a year, valued at about $46,000,000. Ontario and Quebec are the leading dairying provinces.

Related Articles. Consult the following titles for additional information:
Cattle — Cream Separator — Dairying
Churn — Oleomargarine — Milk

BUTTERCUP, or **CROWFOOT**, an attractive roadside flower of a bright yellow color, common in England and America. The plant grows from a foot and one-half to over two feet in height, and bears notched, three-parted leaves. The flowers have five

smooth petals that curve in a manner that suggests a butter cup. To the farmer this charming plant is a troublesome weed. It belongs to a family known also as buttercup. For illustrations of members of this family, see BOTANY.

BUTTERFLY, the most beautiful insect known, of universal interest because of its brilliantly-colored wings, graceful flight and wonderful life history. That the gaily colored butterfly is the outgrowth of a repulsive hairy worm is one of the most facinating miracles of nature. Among the other classes of insects there is one group which bears a close resemblance to the butterflies, and that one is the moth group. It is important to know that they differ in serveral important particulars. The antennae, or feelers, of butterflies are club-shaped, while those of moths are threadlike or of feather-form. When at rest butterflies hold their wings in a vertical position, while those of the moth remain flat. Butterflies fly by day, while with few exceptions moths fly at twilight or during the night. The butterflies, too, usually have more slender and more brightly colored bodies than the moths.

Parts of a Butterfly. The body of the butterfly has three parts: head, thorax and abdomen. The conspicuous parts of the head are the two antennae, the eye clusters, or ocelli, and the tongue, which, when not in use, is coiled like the spring of a watch. Between the ocelli is a sucking apparatus, by means of which the insect draws its food up through the long tube constituting the tongue. The butterfly has six legs and four wings, all of which are attached to the thorax. The legs are weak and are used only when the insect is resting or feeding.

The wings are large and strong; the first pair is usually triangular, the second pair, rounded. In some families, such as the swallow tails, the second pair of wings has long narrow or pointed extensions. The wings consist of membranes supported on a framework of tubes, which serve the double purpose of veins and air tubes. These tubes are double, one within the other. The air circulates through the outer and the blood through the inner. The membrane of the wings and the body of the butterfly are covered with minute scales, arranged like the scales on a fish or the shingles on a house. These scales, when viewed under a microscope, resemble feathers. They are highly colored and have a perfect structure. It is to them that the butterfly owes its brilliancy and beauty. When a butterfly is caught by the wings, the scales rub off like a fine dust. Their removal from the wings impairs the flight of the insect, or prevents it altogether.

Classification. Butterflies and moths constitute the insect order Lepidoptera, or scaly-winged insects (see INSECTS). The butterflies of North America are classed under the following families:

1. "Brush-footed" Butterflies (Nymphalidae).
2. "Metal Marks" (Lemonidae).
3. "Blues," "Coppers" and "Hair-streaks" (Lycaenidae).
4. "Swallowtails" (Papilionidae).
5. "Skippers" (Hesperiidae).

These five families include all the 650 or more species of butterflies found within the United States. About 50,000 species are known in the world.

The first and fourth of these families contain the most conspicuous and best known butterflies. Most of the specimens are large and characterized by brilliant coloring. The swallowtails and the diana are conspicuous species. A comparison of the species inhabiting tropical and semi-tropical climates with those of temperate latitudes shows that the former have more brilliant colors. The largest species of the tropics are the most gorgeous of insect creations. Their expanse of wing is often eight or more inches, and their coloring is more brilliant than that of the richest tropical flowers.

The habitats of the other species, common in the Southern states, are as follows: The *White Skirted Calico* is a native of Texas; the *Cloudless Sulphur* is common from New England and the Great Lakes to the extreme southern points of South America; the *Great Purple Hair-streak* is common in Central America, Mexico and the Gulf States, and the *Mimic* is a native of Florida and the West Indies.

Life History. Butterflies undergo a complete transformation, or metamorphosis; to

complete their life histories they live in four forms: the egg; the larva, or caterpillar; the pupa, or chrysalis, and the imago, or perfect insect.

The eggs are deposited either singly or in clusters on or near the plant upon which the larva feeds. Each fertilized egg contains the germ of the larva and a fluid upon which this germ is nourished during the period of incubation. This period varies with the species, the locality and the season. In warm countries, and during the summer months, in temperate latitudes, the period of incubation does not usually exceed three weeks, while it may be less. But in cold climates the period is much longer, and in temperate climates the eggs deposited in the fall do not hatch until spring.

The larva, or caterpillar, is the second stage in the development of the butterfly. The work of the caterpillar is to eat and grow, and it applies itself industriously to its task (see CATERPILLAR). The duration of the larva stage varies with the locality, the season and the species. In temperate climates the larva stage lasts from three to four months, while in the cold regions, where the winters are severe, the period is often ten months. When the second stage is completed, the caterpillar is transformed into a pupa or chrysalis. While the caterpillars of moths generally spin cocoons of silk in which the pupa is enclosed, those of butterflies form a chrysalis having a hard, smooth outer case. The caterpillars of many species attach themselves by buttons of silk to the under side of leaves and change into naked chrysalides hanging head downward.

In other species the chrysalis is attached at one end and also suspended by a silk cord attached to the branch a little more than half the distance between the first point of suspension and the other end of the chrysalis. Chrysalides thus suspended usually take a nearly horizontal position. With few exceptions chrysalides are of a dull color, resembling the object to which they are attached. In the pupa state the insect is to all appearances lifeless, yet it breathes through small pores, and the mysterious life processes of transformation are slowly operative. Many butterflies remain in the chrysalis only a few weeks, while some continue through the winter, or, in tropical climates, during the dry season, before the transformation is completed. When the imago, or perfect insect, emerges from the chrysalis, it retains some resemblances to the caterpillar, but in from two to four hours its form becomes perfect and it is ready for flight.

Butterflies feed chiefly on the nectar of flowers. In most species, life in the perfect state lasts but a few days; as soon as the eggs for the next brood are deposited, the insect dies. The male and female of the same species usually differ in color, and frequently in size, and are often taken for different species.

Suggestions for Study. To study the life history of a butterfly we should properly begin with the egg. Unfortunately the pupils may not always be able to find eggs; in that case, they may begin with the second, or caterpillar stage. Teachers and parents will find that the children will take a lively interest in the development of the caterpillar. A

LIFE HISTORY OF A BUTTERFLY
1. Eggs, highly magnified. 2. Caterpillar.
3. Chrysalis. 4. Butterfly.

caterpillar may be kept in a glass case, set in a sunny place; if he is fed and given a twig and leaves to build a cocoon, the class may soon see him spin himself into his retreat and finally emerge a perfect butterfly. Let the children keep a record of daily observations of any changes they may notice. Not only will they be interested in the caterpillar, but they will, unknown to themselves, be learning how to observe carefully and systematically. Incidentally the teacher will find many opportunities to teach the lesson of kindness to animals.

Outline on The Butterfly

I. General Description
- (1) Insect
  - (a) Different from moth
    - (1) Shape of antennae
    - (2) Position of wings at rest
    - (3) Time of day when it flies
- (2) Anatomy
  - (a) Head
    - (1) Antennae
    - (2) Eyes
    - (3) Tongue
  - (b) Thorax
    - (1) Legs
      - (a) Number
      - (b) Structure
    - (2) Wings
      - (a) Number
      - (b) Structure
  - (c) Abdomen
- (3) Color, size and form
  - (a) Variations
    - (1) Due to sex
    - (2) Due to climate
- (4) Habits
  - (a) Feeding
  - (b) Hibernation
  - (c) Migration

II. Classification
- (1) North America
  - (a) Brush-footed
  - (b) Metal marks
  - (c) Blues, coppers and hair-streaks
  - (d) Swallowtails
  - (e) Skippers
- (2) Arctic Regions
- (3) Temperate zones
- (4) Tropics

III. Life History
- (1) Eggs
  - (a) Where deposited
  - (b) Number
  - (c) Time required for hatching varies
    - (1) According to species
    - (2) Locality
    - (3) Season
- (2) Caterpillar or Larva
  - (a) Definition
  - (b) Duration of this stage
  - (c) Anatomy
    - (1) Head
      - (a) Antennae
      - (b) Eyes
      - (c) Mouth
    - (2) Body
    - (3) Organs
  - (d) Food
  - (e) Method of self-defense
  - (f) Molting
- (3) Chrysalis or pupa
  - (a) Apparently lifeless
  - (b) Protected
    - (1) By cocoon
    - (2) By chrysalis
  - (c) Duration of the stage
- (4) Butterfly or imago

Questions on the Butterfly

To what great division of animals does the butterfly belong?

In what respects is the butterfly different from the moth?

What are the three parts of the butterfly's body?

What are the antennae? Ocelli?

What is the position of the tongue when not in use?

To what part of the body are the legs and wings attached?

How many legs has a butterfly? How many wings?

What is the structure of the wing? What are the usual shapes?

To what is the brilliant coloring of the wings and body due?

On what do butterflies feed? How is this food obtained?

What are the principal causes of variations in color and size?

Where are the largest varieties found? How large are they?

Name the five principal classes of butterflies found in North America.

Where are the eggs deposited?

How long is the period of incubation? Is it uniform in all climates and in all seasons?

The accompanying illustrations should be of value to all who study the butterfly; the four states in the life of the swallowtail, one of the commonest North American butterflies, are clearly shown. It is not necessary to give detailed instructions as to the order in which different phases of the subject may be considered, but the following outline and questions are suggested in the hope that they will enable the student to see the field of study at a glance and devote himself to it in a systematic way.

BUTTERINE, *but'tur in.* See OLEOMARGARINE.

BUTTERNUT, the fruit of the white walnut, so called from the rich oil it contains. The tree grows in the northeastern part of the United States, and may be recognized by its grayish bark, large, yellow-green leaves and pointed, oblong nuts. The wood is light brown in color, and has a coarse grain and satiny sheen. It is used to make interior finishing in houses and in cabinet work.

BUTTERWORT, *but'er wert,* a plant that grows in bogs and marshes, and bears small purple flowers and short, thick leaves. The latter, which cluster about the base of the plant, are covered with hairs that secrete a fluid which attracts insects. The edges of a leaf curl over any insect which lights on it, and the victim is used by the plant as food (see CARNIVOROUS PLANTS). In the northern part of Sweden the leaves of the butterwort are used to curdle milk. The name was applied because of the power of the plant to coagulate milk, also to the fact that the leaves have a smooth, oily, buttery texture. The butterwort is common in North America, Europe and Asia, but is practically unknown in Africa.

BUTTERWORT

BUT'TERWORTH, HEZEKIAH (1839–1905), an American editor and writer for young people. He had only a common school education, but he supplemented it by extensive travels in the United States and abroad. In 1871 he became editor of *The Youth's Companion* in Boston, a position he held till 1894. He is the author of *Zig-zag Journeys, In the Boyhood of Lincoln, The Patriot Schoolmaster* and many other juvenile works, besides several volumes of poems and essays. As a platform lecturer on literary subjects, travel and child training, he achieved considerable fame and popularity.

BUT'TONS, articles used for fastening together wearing apparel or for ornaments. Buttons are made of paper, glass, pearl, shell, horn, ivory, vegetable ivory, wood and iron. According to their pattern they are divided into three general classes: *hole* buttons, *shank* buttons and *covered* buttons. Hole buttons have holes drilled in the center, through which they are sewed onto the cloth. Shank buttons contain a loop of wire, generally known as the *eye,* by means of which the button is attached. Covered buttons consist of wooden or iron molds covered with cloth.

The manufacture of buttons became an important industry in England during the reign of Queen Elizabeth, and Birmingham was then, as now, its chief center. Metal buttons were manufactured in the United States at Philadelphia as early as 1750, and in 1800 a button factory was established at Waterbury, Conn. This town is now the center of metal button manufacture in America. The most important branch of the button industry in the United States, however, is the making of pearl buttons, of the shells of a species of fresh-water mussel found in large numbers in the Mississippi River. This industry began in Iowa, and factories are now found along the river from Red Wing, Minn., to Louisiana. The process of making these buttons is very simple. The shell is soaked until it is soft; it is then cut by tubular saws into circular pieces the size of the button. The holes are then drilled in these, and the buttons are polished and finished. Owing to the brittleness of the shell, nearly all of the work has to be done by hand.

There are many styles of buttons. Aside from the pearl buttons, those in most common use are made from vegetable ivory, which will take any color, from gutta-percha and from celluloid. Expensive metal buttons are used for special purposes, and a modern feature of the button industry consists in the manufacture of buttons to be worn as symbols of membership in some

organization. Some of these, such as those used by the Grand Army of the Republic, are beautiful works of art and are made of bronze, gold or silver. Others, made of celluloid, contain mottoes, symbols or photographs. There are about 450 button factories in the United States, and their annual output has a value of over $20,000,000.

BUT'TRESS, in architecture, a projection on the outside of the walls of an edifice, intended to give additional support to the walls. It originated among the Byzantines, but attained its highest and most beautiful form in the Gothic architecture, where it came to be used wholly as an ornament. *Flying buttresses*, of a somewhat arched form, often spring from the top of the ordinary buttresses, leaning inward so as to abut against and support a higher portion of the building, thus receiving part of the pressure from the weight of the roof of the central pile.

BUTYRIC ACID, *bu teer'ik*, an acid obtained from butter and found also in perspiration, cod-liver oil and other substances. Butyric acid is a colorless liquid, having a smell like that of rancid butter; its taste is at first burning and biting, with a sweetish after-taste.

BUZ'ZARD, a hawk of a genus that is common both in Europe and America, though in the United States the name is more commonly applied to the turkey buzzard (which see). The common buzzard of Europe is distributed over the whole of that grand division, as well as over the north of Africa. It feeds upon mice, frogs, toads, worms and insects, and is very sluggish in its habits.

BUZZARD'S BAY, a bay on the south coast of Massachusetts, separated from Vineyard Sound by the Elizabeth Islands. It is thirty miles long and from five to ten miles wide, and contains the harbors of New Bedford, Wareham, Sippican, Nasketucket and Mattapoiset. Buzzard's Bay is a popular summer resort.

BY'-LAW, a law made by an incorporated or other body, for the regulation of its own affairs or of the affairs entrusted to its care. Town councils, railway companies and other bodies enact by-laws, which are binding upon all coming within the sphere of their operations. By-laws must of course be within the meaning of the charter of incorporation and in accordance with any higher law which binds the body or its members.

The Castle of Chillon

BYRON, George Noel Gordon, Sixth Lord (1788-1824), an English poet of the Romantic Period, whose life and personality have attracted almost as much interest as his poetry. He was handsome and high-spirited, and possessed a passionate temperament that made him bitterly resentful of everything that interfered with him. In fact, he so impressed his own and a later age that the term "Byronic" has come to stand for that which is bitter or satirical.

Until he was seven years of age Byron was entirely under the care of his mother, and to her injudicious indulgence the waywardness that marked his later career has been partly attributed. On reaching his seventh year he was sent to the grammar school at Aberdeen, and four years after, in 1798, the death of his grand-uncle gave him the titles and estates of the family. Mother and son then removed to Newstead Abbey, the family seat, near Nottingham. Soon afterwards Byron was sent to Harrow, where he distinguished himself by his love of manly sports, though a childhood illness had left him permanently lame. In 1805 he was entered at Trinity College, Cambridge. Two years later appeared his first poetic volume, *Hours of Idleness*, which, though containing nothing of much merit, was criticised with unnecessary severity by Brougham in the *Edinburgh Review*. This criticism roused Byron and drew from him his first really notable effort, the celebrated satire, *English Bards and Scotch Reviewers*.

LORD BYRON

In 1809, in company with a friend, Byron visited the southern provinces of Spain and voyaged along the shores of the Mediterranean. The fruit of these travels was *Childe Harold's Pilgrimage*, the first two cantos of which were published on his return in 1812.

The poem was immediately successful and Byron "awoke one morning and found himself famous." During the next two years *The Giaour, The Bride of Abydos, The Corsair* and *Lara* appeared, and Byron's literary reputation grew steadily. During these years, however, he was living in the most reckless dissipation. In 1815 he married the daughter of Sir Ralph Milbanke; but the marriage turned out unfortunately, and in about a year Lady Byron left him for her father's house and refused to return. This rupture gave rise to much popular indignation against Byron, who left England, with an expressed resolution never to return. He visited France, the field of Waterloo and Brussels, the Rhine, Switzerland and the north of Italy; for some time lived at Venice, and latterly at Rome, where he completed his third canto of *Childe Harold.* Not long after appeared *The Prisoner of Chillon, The Dream, and Other Poems;* and in 1817 *Manfred,* a tragedy, and *The Lament of Tasso.*

From Italy Byron made occasional excursions to the islands of Greece, and at length he visited Athens, where he sketched many of the scenes of the fourth and last canto of *Childe Harold.* Between 1817 and 1822 appeared, among other poems, five cantos of *Don Juan* and a number of dramas. While living at Pisa he enjoyed for a time the companionship of Shelley, one of the few men whom he entirely respected and with whom he was quite confidential. Besides his contributions to the *Liberal,* a periodical established at this time in conjunction with Leigh Hunt and Shelley, he completed the later cantos of *Don Juan,* with *Werner,* a tragedy, and *The Deformed Transformed,* a fragment. These are the last of Byron's poetical works. In 1823, troubled perhaps by the consciousness that his life had too long been unworthy of him, he threw himself into the struggle for the independence of Greece. In January, 1824, he arrived at Missolonghi, where he was received with the greatest enthusiasm. The malarious air of Missolonghi began to affect his health, and on April 9, 1824, while riding in the rain, he caught a fever, which ten days later ended fatally.

Byron's natural force and genius were perhaps superior to those of any other Englishman of his time, and won for him in his own day a fame second to none of his contemporaries. After his death his work was for some time as far underrated as it had been overrated during his life, and it is only within the last few decades that a calm judgment has been passed on his writings. His poetry frequently represents his rebellious attitude toward society and convention, and at such times he has a tendency to pose, to utter bombastic statements. At other times, however, he inspires and elevates the reader with lines of noble music and with splendid descriptions of the night and the sea. Altogether, his life and his work were alike unbalanced, and it was his misfortune, and the world's, that he died just as he was beginning to find his best self.

BYZANTINE, *be zan'tin,* **ART,** a style which arose in Southeastern Europe after Constantine the Great had made Byzantium the capital of the Roman Empire (A. D. 330), and ornamented that city with all the treasures of Grecian art. To a certain extent Byzantine art may be recognized as the endeavor to give expression to the new elements which Christianity had brought into the life of men. The tendency toward Oriental luxuriance and splendor of ornament quite supplanted the simplicity of ancient taste. Richness of material and decoration was the aim of the artist, rather than purity of conception. The style made use of Roman constructive principles, Oriental ornamentation and color, and Greek freedom and use of detail.

With regard to the *sculpture,* the statues no longer displayed the freedom and dignity of ancient art. The true proportion of parts, the correctness of the outlines and, in general, the severe beauty of the naked figure or of simple drapery, exemplified in Greek art, were neglected for extravagant costume and ornamentation and petty details. From the sixth to the eleventh century, which was the best period of Byzantine art, figures were produced which possessed considerable beauty and preserved a dignity that was really difficult to obtain with such artificial forms as were created. The artists, who employed no models, naturally departed from nature, and their work is showy rather than beautiful. The figures, with their brilliant costumes, may be readily recognized after they have once been pointed out. One of the favorite branches of the art was mosaic work, and in this the artists succeeded in obtaining a brilliant effect with costly stones. See ARCHITECTURE.

Byzantine Soldier

BYZANTINE, *bi zan'tin*, **EMPIRE**, also called the Eastern Greek, or Later Roman Empire. For nearly 1,000 years, from the death of Theodosius the Great, A. D. 395, to the fall of Constantinople, in 1453, it existed as an independent dynasty, standing guard through the Dark Ages against the inroads of the barbarians, and preserving from destruction all that was best in civilization. Its history is long and interesting. Theodosius the Great before his death divided his dominions between his two sons, Honorius and Arcadius, and the latter became the first of the Byzantine emperors (see THEODOSIUS). He was a weak ruler, who made few attempts to hold the power in his empire, but let it be exercised by his ministers.

During the reign of Theodosius II (408–450) the regency was secured by his sister Pulcheria, and was retained even after he reached his majority. She gave the Empire an able administration, carrying on a successful war against the Persians and recovering for Valentinian III the Western Empire, in return for which service the Byzantine territory received cessions to the westward. The ravages of Attila and the Huns in Thrace and Macedonia were averted only by the payment of annual tribute. On the death of Theodosius, Pulcheria was called to the throne, and she was the first woman to enjoy this dignity. She married Marcianus, whose successful reign continued four years after the death of his wife. Leo I, a hitherto almost unknown Thracian, succeeded, and he was himself succeeded in 474 by Zeno the Isaurian (474–491). Zeno was driven from his capital by Basilicus, but regained the throne. His empire was threatened by Theodoric and the Goths, but the peril was averted by large presents, and the invaders were induced to march westward to Italy. During Zeno's reign occurred the disastrous fire at Constantinople, by which the library, with more than 100,000 manuscripts, was destroyed. Anastasius (491–518) built the famous "long walls" across the peninsula, to protect Constantinople.

Justin I (518–527) was succeeded by his nephew, the famous Justinian I (527–565), under whom the Byzantine Empire enjoyed the most glorious period of its existence (see JUSTINIAN I; BELISARIUS).

His unfortunate successor, Justin II (565–578) was harassed on one frontier by the Persians, on the other by the terrible Avars. Most of Italy was lost to the Lombards. The reign of Heraclius (610–641) presents a series of overwhelming reverses retrieved by glorious victories. The Persians took Syria, Palestine and Asia Minor, and the invading hordes advanced to a point within sight of Constantinople. Shrewdly gaining time by a humiliating treaty, Heraclius collected his forces and inflicted a defeat upon the Persians at Issus.

The Moslem hordes of Arabs under Mohammed and his successors appeared next. Between 635 and 641 Syria, Judea and all the African possessions were lost. What remained, however, was more closely united than before, and from this time the empire became distinctly Greek in character. The dynasty of Heraclius ended with Justinian II, who was assassinated in 711. The eighth and ninth centuries witnessed a peculiar internal religious controversy, which greatly weakened the defense of the Byzantines against their foreign foes. This was the war of the Iconoclasts, most violent under Leo III, the Isaurian (717–741), himself an ardent Iconoclast (see ICONOCLASTS). Leo's successor, Constantine V (741–775), was also a zealous Iconoclast and closed many monasteries and convents. Image-worship was restored for a brief period by the Empress Irene, who had obtained the throne by blinding her own son, Constantine VI, for whom she was guardian (797). She was ambitious to marry Charlemagne and thus to reunite the Eastern and Western empires, but her plan was not supported. During the reign of Leo V (813–820), the Bulgarians overran Thrace and laid siege to Constantinople, but they were finally repulsed. The Saracens captured Crete and Sicily (824–827). Under Michael III (842–867), who reigned first under the guardianship of his mother, Theodora, the images were finally restored in the Greek Church. It is at this time that the Russians first appear as enemies of the Empire.

The Macedonian dynasty (867–1057) was founded by Basil I, during whose reign the

Saracens conquered Sicily and ravaged the Peloponnesus. His son, Leo II (886–912), called in the Turks to aid against the Saracens, and thus the former paved the way for future conquests. Under Basil II the Bulgarian kingdom was overthrown, and that country became a Greek province (1018), remaining so until 1186. About the middle of the eleventh century the Seljuk Turks became threatening, and in Italy the Byzantine possessions were nearly all seized by the Normans. Isaac, the first of the Comneni, reigned from 1057 to 1059. Under his successors the inroads of the Seljuks became more frequent, and by 1078 they had conquered nearly all of Asia Minor.

The steady advance of the Mohammedan power alarmed all Christian Europe, and during the reign of Alexius Comnenus (1081–1118), began the wonderful movement of allied Christendom known as the Crusades (see CRUSADES). As the hosts marched toward Asia Minor *via* Constantinople, the movement could not but have an important influence on the fortunes of the Byzantine Empire. Alexis wanted help against the Turks, but the vast numbers that came alarmed him, and their depredations within his territory led to serious conflicts, and finally, under later emperors to open hostility. In 1204 Constantinople was taken by the Crusaders, who established the Latin Empire (1204–1261), with Count Baldwin of Flanders as first emperor. This Latin Empire was never strong, and in 1261 the emperor of Nicaea, Michael Palaeologus, captured Constantinople and reëstablished the Greek Empire.

Michael (1261–1282) founded the dynasty of the Palaeologi, which lasted until 1453. He made fruitless efforts to reunite the Greek and the Latin churches. His son, Andronicus II (1282–1328), attempted to repel the Turks, but in the following reign they took Nicaea and Nicomedia. In 1361 the Sultan Amurath took Adrianople, and he afterward conquered Macedonia and part of Albania, whereupon the emperor, John (1341–1391), acknowledged himself Amurath's vassal and agreed to pay tribute. The Turks attacked Constantinople in April, 1453, with an army of 400,000 men, under Sultan Mohammed II. The garrison held out until May 29, when the city was finally taken, Constantine, the last of the Byzantine emperors, falling in the thick of the fight. The various principalities and islands were conquered by 1461, and the last vestige of the Byzantine Empire had disappeared.

BYZANTIUM, *be zan'she um,* the original name of the city of Constantinople (which see).

C, the third letter in the English alphabet and in all other alphabets derived from the Phoenician. It occupies the same place as the Greek *gamma*, and it originally had a similar sound, that of hard *g*. In English, *c* now represents two perfectly distinct sounds, namely, the guttural sound belonging to *k* and the sharp or thin sound of *s;* while it also forms with *h* the digraph *ch*. It may be said, in general, that *c* has the *k* sound before the vowels *a, o* and *u*, the *s* sound before *e, i* and *y*. The digraph *ch* has three different sounds, as in *church, chaise* and *chord*.

In music, *C* is the first or key note of the diatonic scale of *C* major. When placed after the clef sign, *C* is the mark of common, or $\frac{4}{4}$ time. As an abbreviation, *C* stands for one hundred and for Centigrade; *c* stands for cent.

CABAL', the name given to a group of men who are banded together for the promotion of their own interests, especially political interests. The name is said to be derived from the initial letters of the names of the cabinet of Charles II—Clifford, Ashley, Buckingham, Arlington and Lauderdale, who formed the most famous cabal in English history. The most notable one in America was the Conway Cabal (which see).

CABBAGE, *kab'aj*, a common garden vegetable cultivated for its edible leaves, which in the common varieties are crowded together in dense heads. The wild cabbage is a native of the coasts of Britain, but it is much more common on other European shores. The kinds most cultivated are the common cabbage, the savoy, the broccoli and the cauliflower. The common cabbage forms its leaves into heads or bolls, the inner leaves being nearly white. Its varieties are the white, the red or purple, the tree or cow cabbage, for cattle, and the very delicate Portugal cabbage. The garden sorts form valuable culinary vegetables and are used at table in various ways.

In Germany pickled cabbage forms a national dish. It is known there as *sauerkraut*, but since 1917, because of war sentiment, has been called "liberty cabbage" in the United States. The cow cabbage of the Channel Islands attains gigantic proportions for a vegetable, and the stalks, which frequently grow to heights of twelve or sixteen feet, are used as rails for fences and as rafters for the thatched roofs of farm buildings, while shorter ones are made into umbrella handles and walking sticks, which are much in demand as curiosities among tourists. In the United States raising cabbages on truck farms near large cities constitutes an important industry.

Cabbage Worm. This is the most destructive of the cabbage enemies. It is the young of the white butterfly, common from early spring through the summer. There are several species. Cabbage worms are bluish-green in color, about an inch and a half in length, and are very destructive, feeding on the leaves and burrowing into the head of the cabbage. There is an almost equally destructive worm from the cabbage moth, dark in color. Destruction of cabbages may be prevented by spraying the plants with kerosene emulsion before the heads form.

CABBAGE PALM, a name given to various species of palm trees, because the terminal bud, which is of great size, is edible and resembles a cabbage. It is a species of the areca palm (see ARECA). The palmetto is a variety of cabbage palm found in the West Indies and Southern United States. See PALMETTO.

CABBAGE ROSE, a species of rose of many varieties, supposed to have been cultivated from ancient times, and eminently

fitted, because of its fragrance, for the manufacture of rose water and attar. The name Provence rose is sometimes given this species.

CABINET, the body of ministers or secretaries who direct the various executive departments of a government. In Great Britain it is also called the Ministry.

The American Cabinet. In the United States the Cabinet contains ten members, appointed by the President, who become his advisers and under him control all executive functions. The following titles are given to the members:

Secretary of State
Secretary of the Treasury
Secretary of War
Attorney-General
Postmaster-General
Secretary of the Navy
Secretary of the Interior
Secretary of Agriculture
Secretary of Commerce
Secretary of Labor

Appointments to these posts must be approved by the Senate of the United States, but no appointee has ever been rejected by the Senate, for it is admitted that the President's selections for his intimate official family should not be challenged. Members of the Cabinet do not hold seats in the legislative body (Congress) as is the case in Great Britain, where they are members of Parliament.

Cabinet members make annual reports of their departments to Congress, but in all their official acts they are responsible to the President only. The salary of a Cabinet member is $12,000 per year; the appointment has been deemed as for the Presidential term, although President Wilson in 1917 retained the Cabinet from his first administration without reappointment.

For details as to each Cabinet office, see the various titles, in alphabetical order in these volumes.

The British Cabinet. The executive authority in Great Britain is nominally invested in the Crown, but so thoroughly democratic is the country that all responsibility for many years has been vested in the Parliament and the Ministry, or Cabinet. The number of members in the English Cabinet varies from time to time, as special needs may dictate. During the World War there were a Minister of Munitions, an Air Ministry, a Minister of Blockade, and a Ministry of Reconstruction. There never are fewer than eleven members. The following may be considered the minimum membership:

First Lord of the Treasury
Lord Chancellor
Lord President of the Privy Council
The Lord Privy Seal
First Lord of the Admiralty
Secretary of State for Home Affairs
Secretary of State for Foreign Affairs
Secretary of State for the Colonies
Secretary of State for India
Secretary of State for War

To these are generally added the following memberships:

Chief Secretary for Ireland
Chancellor of the Duchy of Lancaster
Postmaster-General
President of the Board of Trade
President of the Board of Agriculture
Lord Chancellor of Ireland
President of the Local Government Board

The members of the Ministry are chosen by the Prime Minister (which see), who selects them as "persons whose responsible situations in public office require their being members." The Prime Minister may hold one of the Cabinet places if he so desires. All Cabinet members are also members of Parliament, and are chosen from the party in political control; if the House of Commons by vote on an important measure shows lack of confidence in the Cabinet it resigns in a body and a new Cabinet, which will reflect the will of the majority, is formed. Meetings of the Cabinet are secret, and no record is kept of the proceedings.

There is no legal recognition of the English Cabinet, and the same can be said of that of the United States, for the Constitution makes no reference to such a body. The English custom has grown from the time of William III.

The Canadian Cabinet. The executive department of the Dominion of Canada is based on that of the mother country. Members of the Cabinet are appointed by the Governor-General; they must be members of the Canadian Parliament, and their number varies from sixteen to twenty. Ministers in charge of departments receive $7,000 per year, in addition to their salaries of $2,500 as members of Parliament. The names of the usual offices in the Cabinet follow:

1. The President of the Council presides over the meetings of the Ministry. He has no executive duties, except such as relate to the work of the council as a whole. This office is

usually, though not necessarily, held by the Premier (see subhead, below).

2. The Minister of Justice and Attorney-General of the Dominion is the legal adviser of all the government departments. The administration of justice, including the control of the Royal Northwest Mounted Police and of prisons, is in his hands. He also reviews all the laws passed by the provincial legislatures.

3. The Minister of Finance has charge of the Dominion finances. He presents the annual budget to Parliament, explains the government's financial policy as regards the raising and expenditure of revenue, and is responsible for the collection and distribution of funds. See Budget.

4. The Minister of Trade and Commerce executes all laws relating to commerce, industry and allied subjects which are not definitely assigned to some other department. He is also in charge of the census and statistics branch, which was formerly a part of the Department of Agriculture.

5. The Minister of Agriculture, besides the division of industry which gives him his title, has charge of public health, copyrights, trademarks and patents.

6. The Minister of Marine and Fisheries has supervision of the ocean and inland fisheries, of the lighthouse and life-saving service, of the examination of ships' captains and mates, harbors, piers and docks and practically the entire field of fisheries and navigation. The Minister of Marine and Fisheries also acts as Minister of Naval Service.

7. The Minister of Militia and Defense is responsible for the administration of all military affairs, including the military college at Kingston, Ontario. He acts as president of the militia council, which is composed of the Minister, the Deputy Minister, the Chief of the General Staff, and three other officers of the army; this council advises the Minister of Militia.

8. The Minister of the Interior is in charge of the government of the Northwest Territories, the Indians, public lands, forestry branch and the geological survey.

9. The Minister of Railways and Canals is responsible for the management of the Intercolonial Railway, owned by the Dominion government, and for a general supervision of the government canals. He also has some duties in connection with general problems of transportation.

10. The Minister of Public Works has charge of the construction and maintenance of all public works and buildings, except railways and canals.

11. The Postmaster-General controls the management of the Postoffice Department.

12. The Minister of Customs manages the collection of customs duties.

13. The Minister of Inland Revenue has charge of weights and measures and of all excise and other internal taxes.

14. The Minister of Labor acts as arbitrator in labor troubles, and under specified conditions may intervene to end strikes. He may also investigate labor conditions generally and issue reports on them.

15. The Minister of Mines investigates the mineral resources and conditions of the mining industry and issues reports of his findings. He has comparatively few duties and usually holds another position in the Ministry.

16. The Secretary of State registers all documents under the great seal of the Dominion, has charge of public printing and of all official correspondence between the Dominion and provincial governments.

17. The Secretary of State for External Affairs has charge of relations with the British and foreign governments. This office is usually held by the Premier.

CABINET MAKING, the art of producing fine woodwork by hand labor, too delicate and artistic to be made by machinery. The art includes not only fine tables and cabinets, but the exquisite work on the interiors of railway cars, steamer rooms, wainscoting, and the like. The harder the wood employed and the finer its grain the more beautiful is the effect produced. After the desired forms are in place, cabinet making includes sandpapering, filling and varnishing or staining. Fine inlays are among the highest development of the craft.

CABLE, George Washington (1844–), a popular American author of stories having a background of Louisiana and Mississippi River life. He was born in New Orleans. At the outbreak of the Civil War Cable entered the Confederate army and served until the close of the war. While acting as accountant for a cotton firm he wrote various papers for periodicals, and his early success encouraged him to devote himself entirely to literature. His sketches of Creole life revealed to the world an interesting phase of American social life hitherto almost unrecognized, and his keen observation and dexterous use of the Creole dialect at once found him a public on both sides of the Atlantic. Among his books are *Old Creole Days, The Grandissimes, Madame Delphine, Dr. Sevier, The Creoles of Louisiana, The Silent South, Bonaventure, Strange, True Stories of Louisiana, John March, Southerner, The Cavalier, Kincaid's Battery, Gideon's Band, The Amateur Garden, Lovers of Louisiana* and *The Flower of the Chapdelaines.*

GEORGE W. CABLE

The Great Eastern

CABLE, SUBMARINE, the great invention in 1842 which made it possible for the countries of the world to become neighbors in a sense never before thought possible. A telegraph line under water in that year was proved feasible, and was the herald of the day, ten years later, when the great nations began the task of linking the continents with wires on the bed of the ocean. Up to that time weeks and even months elapsed before news of tremendous happenings in any continent could be carried across the seas. To-day no event of importance can happen in any populous center that is not "news" in the next edition of the daily newspapers everywhere.

The Cable. As stated above, a submarine cable is a telegraph line under water. But the cable does not look like the familiar telegraph wire, for the cable wire must be protected from moisture and from possible accidents due to action of waves near shore. A cable consists of a core of copper wire made by twisting together from three to six wires, in an insulating case of gutta-percha, around which jute yarn is wound; a protecting case of wire rope, which in turn is wound with jute yarn saturated with pitch or some other bituminous compound to protect it from the water.

The size of the cable varies according to the stress which it must withstand. It is largest near the shore, where the wear is greatest and where it is subject to danger from anchors. In the deep sea the standard size is a little less than an inch in diameter. Cables are laid on the bottom of the body of water which they traverse, and they are anchored at the land ends, but otherwise they are not fastened. The ends are connected with transmitting and receiving apparatus constructed especially for this sort of telegraph and differing considerably from the ordinary telegraph instruments. The resistance to the electric current is much greater in a cable than in an ordinary telegraph line. A strong current would inevitably burn the insulation and destroy the cable; so the current employed is weak and therefore requires very delicate instruments.

The Instruments. The receiver in most general use consists of an apparatus invented by Lord Kelvin, containing a glass tube in the form of a siphon, one end of which dips into an ink reservoir while the other is drawn to a very fine tip which rests just above the surface of a paper tape that is caused to move uniformly over a table. When in action, the electric current swings the point of the pen to the right and left, and at the same time causes the ink to flow on the ribbon in minute drops, forming a wavy line, a part of which is above and a part below a line drawn lengthwise through the middle of the tape. The portions of the line on the upper half of the tape are read as dots, and those in the lower half as dashes. By use of this device the message is read in the Morse alphabet.

The earliest cables were defective and in an experimental stage, and messages could be sent but slowly. The first message, to Queen Victoria, ninety words in length, required over an hour for transmission. To-day more than sixty words can be sent each minute.

The First Cables. The early cables were short, and connected places only a few miles from each other. The first successful attempt to telegraph under water was made by Prof. S. F. B. Morse, in 1842. He laid a copper wire, insulated by a covering of hemp, pitch, tar and rubber, from Governor's Island to the Battery, in New York City, and was enabled to send and receive signals over it. The wire was soon caught by the anchor of a ship and broken, but the experiment was sufficiently successful to warrant the conclusion that cables of greater length could be made to work successfully. Ten years later a cable seventy-five miles long was laid between Dover and Ostend, and this also worked successfully. A little later a number of short cables were laid.

Atlantic Cables. For many years there was but one cable under the oceans, and it was world-famous as the Atlantic Cable. It extended from Heart's Content, Newfoundland, to Valentia Bay, Ireland, and was 2,500 miles long. In 1854 the Atlantic Telegraph Company was organized through the efforts of Cyrus W. Field of New York, who secured the coöperation of English and American capitalists. The cable constructed by this company was of the pattern in general use at the present time.

The first cable was completed and loaded on two ships, which were loaned respectively by the governments of Great Britain and the United States. The first of these vessels, the *Niagara* began laying the cable from Valentia, August 6, 1857, but when several hundred miles had been paid out, the cable broke and the vessels were compelled to return to Plymouth, where the cable was stored until the following year, during which time enough new cable was made to supply the loss sustained by the break. At a second attempt the ships sailed to a point midway between the terminals, joined the cable together and proceeded in opposite directions. This cable was successfully laid, on August 17, 1858, connections with the transmitting and receiving instruments were completed, and congratulatory messages passed between the president of the United States and the queen of Great Britain; but after a short time the cable ceased to work.

Notwithstanding all of the difficulties which he had encountered, Mr. Field continued to arouse interest in his enterprise. A third cable was constructed and loaded upon the *Great Eastern,* at that time the largest steamship that had ever been constructed. The laying of this cable began in August, 1865, but after a thousand miles had been paid out the cable broke, and the lost end could not be recovered. This necessitated the making of a new cable, which was successfully laid the following year and has continued to work, with few interruptions, since.

Pacific Cables. There are American and British cables connecting the western coast of North America with the Orient. The former was constructed and laid by the Pacific Commercial Cable Company; it extends from San Francisco to Manila, Philippine Islands, by way of Honolulu, the Midway Islands and Guam. Its entire length is 7,613 miles. The average depth of the ocean bed over which it is laid is three miles. The construction and laying of the cable were completed within eighteen months of the organization of the company, and its completion on July 4, 1903, placed the United States in direct communication with all of its island possessions in the Pacific without the use of foreign lines.

The first British cable connected British Columbia with Australia, and it was constructed conjointly by the governments of Great Britain, Canada, New Zealand and Australia. It extends from Vancouver, British Columbia, to Palmyra, in the Fiji Islands, thence to the Norfolk Islands, from which branches extend to New Zealand and Queensland, Australia. Its entire length is 7,986 miles. It was completed in 1902, and it placed the British possessions of the Pacific Ocean in direct communication with the United States and Canada.

Statistics of Construction. At the present time there are more than forty cables between Europe and the United States, over thirty between Europe and South America, and six between the United States and the Orient, across the Pacific Ocean. In 1918 there were 417 cables, including short lines, aggregating 236,330 miles of wire, owned by private companies; 2,169 cables of various lengths, with 55,458 miles of wire, were owned by various governments. Of these Great Britain and Ireland owned 224; Norway, 770; Sweden, 106; Denmark, 148; Japan, 181; the United States, 15.

Related Articles. Consult the following titles for additional information:
Morse, Samuel F. B. Wireless Telegraph
Telegraph

CABOT, *kab'ot,* JOHN (1450–1498) and **CABOT,** SEBASTIAN (1474–1557), two famous navigators, father and son, who contributed to England's greatness. John Cabot was born in Genoa, Sebastian in Venice. In 1484 the family removed to England, and at the time Columbus made his first voyage John Cabot was a trader of Bristol. He had for some time been interested in the idea of finding a shorter route to the East Indies, and in 1497 he sailed westward under the authority of King Henry VII. Whether or not Sebastian accompanied him is a matter of uncertainty. In June of that year the ship reached the North American coast near Cape Breton, and to that land Cabot laid claim in the name of the the king of England. It was this voyage that gave England its claim to the possession of the North American mainland.

In 1498 John Cabot made a second voyage to the North American coast, and at this time he explored in the vicinity of Greenland and Baffin's Bay. After the death of his father Sebastian was for several years in the Spanish service, visiting Brazil and the Rio de la Plata. Returning to the service of England, he was made chief pilot and later governor of an important trading company.

CABRAL, *ka brahl'*, PEDRO ALVAREZ (1460–1526), a Portuguese navigator and explorer, famous chiefly for one voyage, made during the winter of 1500–1501. He set out for the East Indies by way of the Cape of Good Hope, but was driven west by adverse winds and the equatorial current and touched Brazil, of which he took possession in the name of the king of Portugal. A Spaniard had previously touched this coast, but Portugal claimed Brazil by virtue of the so-called line of demarcation, which divided certain lands of the New World between Spain and Portugal. After Cabral had reached Brazil he started out again for India and made the first commercial treaty of Portugal with the natives of the East. See DEMARCATION, LINE OF.

CACAO, *ka ka'o*, or **COCOA**, *ko'ko*, a tree from sixteen to twenty feet high, from the fruit of which cocoa and chocolate are prepared. It is a native of tropical America, but it is widely cultivated in the tropics of both hemispheres for its fruit. This consists of pointed, oval, ribbed pods, six to ten inches long, each enclosing from fifty to one hundred seeds in a white, sweetish pulp. In the manufacture of cocoa and chocolate the beans are cleaned and sorted to remove foreign bodies of all kinds and are also graded into sizes to secure uniformity in roasting. The roasting is done in rotating iron drums in which the beans are heated to a temperature of 260° to 280° F.; the result is the peculiar aroma and the elimination of the bitter elements. The beans are dry and their shells are crisp. The beans are next crushed, the light shells removed and the beans left in the form of "cocoa-nibs" or kernels, occasionally seen in the shops. Cocoa-nibs may be prepared with hot water, in the same way that coffee or tea is, but for most people this beverage is too rich. The fat is usually extracted from the beans, which are then ground to a fine powder. It is then ready for use in the ordinary way.

CACAO

In the preparation of chocolate the preliminary processes are followed as for cocoa, except that the fat is not extracted. Sugar and sometimes other materials are added to the ground paste, together with vanilla or other suitable flavoring materials. The final result is a semi-liquid fluid which is molded into the familiar tablets or other forms in which chocolate comes on the market.

Cocoa butter is a common name given to the oil which is prepared from the bean and is much used by confectioners in making candy. When the butter is used for table purposes, a little half-churned cream or butter color is put in. When left white, cocoa butter is almost tasteless and odorless, and it is often used in the kitchen in place of cheap butter or lard.

Practically all civilized nations use cacao in increasing quantities. The figures for the world's consumption, in long tons, for average years, are as follows:

United States	50,420
Germany	44,033
France	25,110
Great Britain	24,100
Holland	19,230
Spain	5,530
Switzerland	9,108
Belgium	4,800
Austria-Hungary	4,972
Canada	2,230

CACHALOT, *kash'a lot.* See SPERM WHALE.

CAC'TUS, a genus of peculiar plants which grow in dry, warm climates. The cacti generally are shrubs having juicy stems, which are covered with minute, scalelike leaves and clusters of sharp spines. In one species only are the leaves at all large. The fleshy stems assume many extraordinary forms, from the branching, treelike cactus to the globe-shaped varieties, both of which are found in the Southwestern United States, where the plants grow in abundance. Although the plant has been introduced and become naturalized in many parts of the Old World, yet all, with the exception of one species, are natives of America. Of some species the fruits are

From original drawings, courtesy of Oscar E. Binner Co., Chicago, Luther Burbank's publishers.

LUTHER BURBANK'S DEVELOPMENT OF THE CACTUS

1—Useless, thorny growth. 2—Thornless cactus and fruit. 3—Section of 2, enlarged, showing fruit, natural size.

edible, and many furnish large and exceedingly beautiful flowers. It is a cactus plant

MELON CACTUS

upon which the cochineal insect lives. See COCHINEAL; CEREUS; PRICKLY PEAR.

Spineless Cactus. Travelers in the southwestern part of the United States find never-ending cause for remark in the millions of acres of land which appear absolutely worthless without water furnished by irrigation systems, as only sage brush and cactus can be made to grow there. Realizing the latent possibilities of the cactus, Luther Burbank set about converting the plant into a food plant for man and animals. In the process of the development of the cactus he first removed the thorns which covered the entire plant. Then by processes of patient development he converted a thorny, worthless plant thriving upon nonproductive land, into a plant the leaves of which are nutritious food for all kinds of stock; the joints of which make excellent pickles; a wholesome food, when fried; a sweetmeat, when preserved. The fruit combines the flavor of the pear and the banana, sells for a price equal to the value of oranges, and is produced at one-half the expense. It is believed there never can be a failure in the cactus crop. The fruit is made into jams, jellies and syrups. Respecting the development of the cactus, we quote from Luther Burbank:

> The population of the globe may be doubled, and yet in the immediate food of the cactus plant itself, and in the food-animals which may be raised upon it, there would still be enough for all.

Six months after planting, some varieties of cactus will produce seventy-five tons of food to the acre; after the second year a production of 150 tons to the acre is possible. A cactus leaf ten inches across will develop thirty-six full-sized cactus pears. From one acre of the average yield of corn $35 worth of denatured alcohol can be produced. The Burbank cactus is producing $1,200 worth of alcohol to the acre.

CADDICE FLY, or **CADDIS FLY**, a little insect which looks much like a moth. Its eggs are laid in the water, attached to some plant. When they hatch, the larvae, which have strong heads and jaws but very delicate bodies, form over the latter a firm case of mud, stones, grass or roots and live under the water until they are ready to emerge from the pupa state. In some species the cases are spiral, like snail shells. The caddice worms are used as bait by anglers.

CAD'DOAN INDIANS, a group of Indian tribes now nearly extinct. Formerly they lived in the country from the Brazos River as far east as Louisiana, and consisted of about a dozen agricultural tribes. Important branches of the group were the Caddo, Wichita and Pawnee. See PAWNEE.

CADET. *ka det'*. See MIDSHIPMAN.

CAD'ILLAC, MICH., founded in 1869, is the county seat of Wexford County, on Little Clam Lake and on the Grand Rapids & Indiana and the Ann Arbor railroads, about 100 miles north of Grand Rapids. It is picturesquely located in a noted hardwood timber district and has an extensive lumber business. There are manufactures of lumber, chemicals, furniture, veneer, and automobile trucks. There is a Carnegie Library and a hospital. The commission form of government was adopted in 1914. Population, 1910, 8,375; in 1917, 10,158 (Federal estimate).

CADIZ, *ka'diz*, SPAIN, capital of the province of the same name, is an important Atlantic seaport situated sixty miles northwest of Gibraltar. It is well built and strongly fortified, and is well paved and very clean. The chief buildings are the great hospital, the customhouse, the old and new cathedrals, the theaters, the bull ring, capable of accommodating 12,000 spectators, and the lighthouse of Saint Sebastian. The Bay of Cadiz, a large basin enclosed by the mainland on one side and a projecting tongue of land on the other, has a good anchorage,

and is protected by the neighboring hills. Cadiz has long been the principal Spanish naval station. Its trade is large, its exports being, especially, wine and fruit. Cadiz was founded by the Phoenicians about 1100 B. C. and was one of the chief seats of their commerce in the west of Europe. In the first Punic War it fell into the hands of the Carthaginians, and in the second Punic War it surrendered to the Romans. Population, 1910, 67,174.

CAD'MIUM, a scarce metal which resembles tin in color and luster, but is a little harder. It is very ductile and malleable, and it fuses a little below a red heat. In its chemical character it resembles zinc. It occurs in the form of carbonate, as an ingredient in various kinds of calamine, or carbonate of zinc. It is also found in the form of a sulphide, as the rare mineral greenockite. Cadmium forms many compounds, of which the sulphide, an orange or lemon-yellow powder used as a coloring agent under the name of *cadmium yellow,* is the most important.

CAD'MUS, in Greek legend the son of Agenor and the brother of Europa. When Europa was carried off by Jupiter in the form of a bull, Cadmus was directed by his father to hunt for her and not to return without her. With his brothers, he set forth on the long quest. One by one the brothers became tired out and stopped by the wayside, but Cadmus kept on until informed by an oracle that his search was useless. This oracle also directed him to follow a cow which he should shortly meet; and where she should lie down there he was to found a city. He carried out these instructions, and the city which he founded was Thebes in Boeotia. After killing a dragon which guarded a fountain near the site of his proposed city, Cadmus sowed the teeth of the dragon and there sprang up a group of armed men. These men contended with one another until all but five of them fell, and these five became, with Cadmus, the first inhabitants of the new city. Many inventions and the introduction of the Phoenician alphabet into Greece were ascribed to Cadmus.

CADUCEUS, *ka du'se us,* a winged rod entwined with serpents, borne by Mercury as an ensign of quality and office. In modern times it is used as a symbol of commerce, since Mercury was the god of commerce. The rod represents power; the serpents, wisdom, and the two wings, diligence and activity.

CAEDMON, *kad'mon,* the first Anglo-Saxon of note who wrote in his own language. He flourished about the end of the seventh century. He was originally a tenant, or perhaps only a cowherd, on the abbey lands at Whitby, but afterward was received into the monastery. According to Bede's *Ecclesiastical History,* Caedmon received one night a vision which commanded him to sing the praise of God, and his poetical work began at that time. His chief work (if it can all be attributed to him) consists of paraphrases of portions of the Scriptures, in Anglo-Saxon verse, the first part of which bears striking resemblances to Milton's narrative in *Paradise Lost.*

CAESAR, *se'zar,* a title, originally a surname of the Julian family at Rome, which after being dignified in the person of the dictator Caius Julius Caesar, was adopted by the successive Roman emperors. The title is perpetuated in the modern forms *kaiser* and *czar.*

One of his soldiers

CAESAR, *se'zahr,* CAIUS JULIUS (100–44 B. C.), a famous Roman general, statesman and historian, son of a Roman praetor of the same name. He was one of those great men of history whose work affected not only his own times, but the history of the world for generations afterward. Great as a warrior, he was also a farseeing statesman, and in oratory and literary ability he ranked with the foremost men of his day. Every high school student who has translated his *Commentaries on the Gallic War* has read a masterpiece of concise historical writing.

Early Career. Caesar was born of an aristocratic family, but his early sympathies were in favor of democracy, and they were strengthened by his marriage with Cornelia, daughter of Cinna. Refusing to divorce her at the command of Sulla, he was proscribed and compelled to flee from Rome, but after the death of Sulla he returned and again took part in public affairs. He espoused the

cause of the people, and his relations with Pompey, a relative of whom he chose for his second wife, combined with his personal talents to win him great power in the popular party. His attempt to procure the Roman franchise for the Latins beyond the Po secured him the sympathies of the Italians. He was elected to various offices, and in all of them he increased his popularity by lavish expenditures and splendid public games.

JULIUS CAESAR

Rise to Power. Catiline's outbreak (63 B. C.) brought discredit on all members of the popular party, Caesar not excepted, although it is thought extremely unlikely that Caesar was concerned in it. After a year spent in Spain as propraetor, Caesar returned to Rome, where he became consul. To gain the assistance of colossal wealth, he made a coalition with Crassus, who, being inferior in intellect, became a tool to work Cæsar's will in the accomplishment of his ambition to become master of the Roman world; and on Pompey's return to Rome, Caesar succeeded in reconciling Pompey and Crassus.

Just prior to taking up his duties as consul, Caesar formed with Pompey and Crassus the so-called First Triumvirate. This was not an organized form of government, but simply a union to promote the interests of its members, and in this it differed from the later triumvirates. As consul, Caesar won the favor of the populace by the agrarian law providing for the distribution of land among the poor. After the expiration of his term as consul, Caesar secured a military command in the West, where he hoped to make himself a position similar to the one held by Pompey in the East. Having received the right to conquer Gaul, with the command of four legions of soldiers, he was fairly launched upon the military career destined to make him master of the Roman world. For nine years he was in Gaul, and the final subjugation of the Gauls was accomplished in nine campaigns.

The Conqueror. In his first campaign he defeated the Helvetii, sending the survivors home to cultivate their land while he overthrew Ariovistus, a German prince who had invaded Gaul. His second campaign was against the Belgae, and in it he defeated four allied tribes united for the defense of Gaul. After wintering at Luca and spending large sums in hospitality, he turned against the Venetii, defeating them totally in his third campaign. His fourth campaign was against two German tribes invading Gaul, whom he defeated and followed across the Rhine. The same year (55 B. C.) he invaded Britain, and won from the senate a thanksgiving lasting twenty days. His second invasion of Britain (54) resulted in the subjugation of the Britons, but it was a nominal subjugation only, as he left no troops to hold the land. His sixth campaign was against revolting Gallic tribes, who were soon reduced to obedience. His most brilliant victory was won in the next year over Vercingetorix, who led a revolt of nearly all the Gallic nations. In the eighth and ninth campaigns (51–50) he accomplished the final subjugation of all Gaul.

Meanwhile matters had changed much in Rome. A stronger alliance of the triumvirs had been formed at Luca, when Caesar was wintering there, but after the death of Crassus, Pompey was forced into a hostile attitude toward Caesar. In 52 Pompey joined the senatorial party against Caesar and procured the passage of a decree ordering the disbanding of Caesar's army. Caesar, with his legions, promptly crossed the Rubicon, which separated his provinces of Gaul from Italy, and advanced toward Rome. Pompey, with the senate and nobles, fled to Greece, and in three months Caesar was master of all Italy. He enjoyed his victory but a short time before he hastened to Spain to overthrow Pompey's legates there. On his return from this expedition he was appointed dictator, an office which he held but eleven days. In January he followed Pompey into Greece and defeated him on the plains of Pharsalia, August 9, 48 B. C. When the news of this victory reached Rome, Caesar was appointed dictator for one year, consul for five and tribune for life.

A ROMAN COIN

Before Caesar again returned to Rome he brought to a successful issue the Alex-

andrian War, undertaken to satisfy the claims of Cleopatra against her brother Ptolemy. Returning through Pontus, he defeated Pharnaces and informed the senate of his victory in the laconic dispatch, *"Veni, vidi, vici"* (I came, I saw, I conquered). He defeated the party of Pompey under Scipio at Thespius, and Cato killed himself at Utica rather than fall into the hands of this universal conqueror. Now undisputed master of the Roman world, Caesar showed his greatness and magnanimity by pardoning the followers of Pompey. The dictatorship was bestowed upon him for ten years by a grateful people, and his victories were celebrated by magnificent triumphs.

His Downfall. After his return from defeating the two sons of Pompey in Spain (45), fresh honors were conferred upon him. He was made *imperator* for life, and his portrait was stamped upon the coins of the realm. In the correction of the calendar, which had fallen into great confusion, he performed an important service, and he proposed many public improvements, such as founding public libraries, draining the Pontine marshes, enlarging the harbor at Ostia and digging a canal across the isthmus of Corinth. None of these designs, however, was he allowed to carry out. After the crown had been offered him at a public festival, the aristocracy, all of whom had received favors at his hands, conspired against his life. On March 15, 44 B. C., he was assassinated, receiving over a score of wounds from the daggers of men whom he had believed were his friends.

Related Articles. Consult the following titles for additional information:

Antony, Mark	Crassus, Marcus L.
Brutus, Marcus Junius	Pompey
Calendar	Rome, subhead History
Catiline	Rubicon
Cinna, Lucius Cornelius	Sulla, Lucius Cornelius
Cleopatra	Triumvirate

CAESIUM, *se'ze um,* a rare metal, first discovered by Bunsen and Kirchhoff by spectrum analysis in 1860. It is soft, and of a silver-white color. It is always found in connection with rubidium and belongs to the same group of elements as lithium, sodium, potassium and rubidium, that is, the group of the alkali metals.

CAFFEINE, *kaf fe'in,* or **THEINE,** *the'in,* the active principle of tea and coffee, a slightly bitter, highly nitrogenous substance, crystallizing in slender, silklike needles. It is found in coffee beans, tea leaves, Paraguay tea and kindred plants. Coffee contains from 0.8 to 3.6 per cent of caffeine; tea, from 2 to 4 per cent. Even moderate amounts of caffeine have the effect of stimulating one mentally by increasing the circulation; large doses cause insomnia, rise of temperature and paralysis of heart action. For these reasons excessive indulgence in tea or coffee is injurious.

CAGLIARI, *ka lyah're,* the capital of Sardinia, is situated on the southern coast of the island, 268 miles from Naples. It is said to have been founded by the Phoenicians. The place contains a cathedral, about thirty churches, an amphitheater, botanical gardens, theaters, a university which was founded by Philip II of Spain in 1596, and a library which contains over 70,000 volumes. The chief manufactures are firearms, powder, soap, leather and cotton goods. The exports are grain, wine, oil, salt and goatskins. Cagliari is the emporium through which nearly all the trade of Sardinia passes. Population of city and suburbs, 1915, estimated, 61,175.

CAIAPHAS, *ka'ya fas,* a Jew, the high priest at the time of the crucifixion. He was deposed A. D. 35, and Jonathan, the son of Annas, was appointed in his stead. (*Matt.* XXVI, 57).

CAIN, *kane,* the eldest son of Adam and Eve and brother of Abel. His story is related in *Genesis* IV. Because the Lord "had respect for" the offerings of Abel, and none for those of Cain, the later killed his brother in a fit of jealous anger. As a punishment he was forced to become a wanderer, and that he might not be slain the Lord placed a mark upon him. The "mark of Cain" has come to be a well-known figure of speech.

CAINE, Thomas Henry Hall, Sir (1853–), an English novelist, who has won considerable popularity in England and America as the author of stories which have a special appeal because of their underlying gloom. He was born at Runcorn, England, and educated in the schools of the Isle of Man and Liverpool. Caine was educated to be an architect, but preferred journalism, and for six years was a leading writer on the Liverpool *Mercury.* On the invitation of Dante Rossetti, he went to London in 1881 and lived with Rossetti until the death of the latter in 1882. During the last year of the poet's life Caine prepared his *Recollections of Rossetti.* This was followed by his

Songs of Three Centuries, and the next year by *Cobwebs of Criticism.* After this, Caine began his career as a novelist. After 1885 he produced, among other books, *The Shadow of a Crime, The Son of Hagar, The Deemster, The Bondman, The Manxman, The Christian, The Eternal City, The White Prophet* and *The Woman Thou Gavest Me.* Several of his novels have been dramatized, both for the regular stage and the moving picture screen. In 1916 he published a play, *Margaret Schiller,* which was produced in New York. In 1918 he was knighted.

CAIRN, a heap of stones built up over a grave, or serving as a landmark. These heaps are very common in Great Britain, particularly in Scotland and Wales, where they are generally of a conical form. Some are evidently sepulchral, containing urns, stone chests or bones; some were evidently erected to commemorate some great event, while others appear to have had a religious significance. A religious or mystical meaning still attaches to the building of cairns among many primitive tribes, and they are usually erected, not all at one time, but by the efforts of passers-by, each of whom adds a stone to show his interest in the object for which the heap was begun.

CAIRO, *kī'ro,* EGYPT, the capital of the country and the largest city in Africa, called by the Arabs *Misr-el-Kahira,* is over 1,300 years old. It was founded by Amru, a savage conqueror of Egypt, in the year 640. Cairo is the delight of winter tourists, who flock to it by thousands every year, for here East and West meet, and the cosmopolitan atmosphere of the place presents an ever-changing panorama. Afghans, Arabs, Berbers and a score of other tribes afford a scene of coloring and confusion of tongues that is not found elsewhere in Europe or Africa on a like scale.

Cairo is on the River Nile, 150 miles from the Mediterranean Sea at Alexandria, and eighty miles west of Suez. Parts of an ancient wall still stand and several well-defined sections, the result of growth through the centuries and the separation of nationalities, are clearly evident.

The old Arabian quarter has narrow, crooked, unpaved streets, lined with high stone houses. The modern portion has such conveniences as gas-lighting and electric street railways, and has broad avenues and beautiful buildings. Among the chief interests of Cairo are the numerous mosques, which are considered the best examples of Arabic architecture. The Gami-ibn-Tulun erected about 879, is the finest, and the Gami-Amra is the oldest. Of this, only a portion is left. Among other mosques are the Mehemet Ali, a structure of great merit, having high minarets of alabaster, and the mosque of Kait Bey, dating from the fifteenth century. Cairo formerly had many obelisks, but most of these have disappeared and are now in various European and American cities.

Cairo ranks high as an Oriental educational center, among its institutions the most important being the El-Azhar, considered the oldest university in the world. Besides these, there are schools of art and medicine, a polytechnical school and a library. The city is the seat of administration of Egypt. The trade is large, and the bazaars and markets are numerous. The manufactures include metal articles, textiles and essences of flowers. Through the Middle Ages the city was one of the chief centers of Mohammedan learning, and the center of trade between Europe and the East. From 1798 to 1801 it was held by the French, later passed to the Turks and through them to Mehemet Ali, the founder of the present dynasty, which under the British, rules the country. Population, 1917, 785,000.

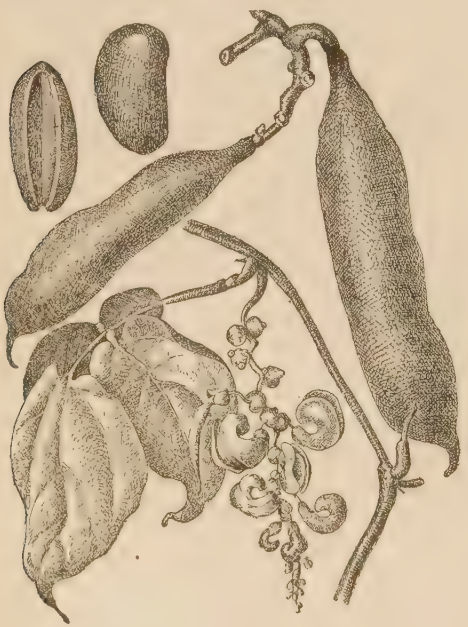
CAIRO, *kā'ro,* ILL., at the southernmost point in Illinois, at the junction of the Ohio and Mississippi rivers, is the county seat of Alexander County. It is 364 miles from Chicago and 148 miles from Saint Louis. The city is protected from the frequent floods on the two rivers by an almost perfect system of stone and concrete levees and walls. Five railroads enter the city—the Illinois Central, the Mobile & Ohio, the Saint Louis & Southwestern, the Saint Louis, Iron Mountain & Southern and the Big Four. The water commerce is largely in general merchandise, lumber and coal. Woodworking factories lead in industrial enterprises. A Federal building was erected in 1871; there is a fine library, the Safford Memorial, and there are three hospitals. The commission form of government was adopted in 1913. Population, 1910, 14,548; in 1917, 15,995 (Federal estimate).

CAISSON, *kase'son,* in civil engineering, a water-tight box, or casing, used in building structures in water too deep for the cofferdam, such as piers of bridges and

quays. The caisson is sunk to the bottom of the river and is large enough to contain the entire structure to be built within it. The pneumatic caisson is an air-tight chamber, sunk to the bed of the stream and entered through an air lock. Ventilation is secured by air pumps. The term *caisson* is sometimes applied to floating docks. See DOCK.

CAISSON, *kase'son*, the ammunition wagon attached to a piece of field artillery. The term is used in two ways. It may refer to a two-wheeled vehicle carrying one ammunition chest with a capacity of seventy rounds; and it may signify a four-wheeled vehicle consisting of the caisson body and the *limber*, or forepart, to which the horses are attached. The limber may be detached and fastened to a gun.

CAL'ABAR BEAN, the seed of an African plant, nearly allied to the kidney bean. It is so powerful a narcotic poison that six beans will produce death. The calabar bean



CALABAR BEAN

is the famous "ordeal bean" of Africa, administered to persons suspected of witchcraft. If the accused vomits the bean and recovers, it is a sign of innocence. It is employed in medicine, chiefly as an agent for producing contraction of the pupil of the eye, and in the treatment of neuralgia, lockjaw and rheumatism.

CALABASH, *kal'a bash*, a gourd somewhat similar to the crookneck species of squash, and cultivated in the same way. Its shell is smooth and so hard that, cut in two parts, it was once used largely for dippers and various vessels for holding liquids.

The *Calabash pipe*, so much sought by smokers, is made from the neck of the calabash of the crookneck variety. The first pipe of this nature was made by a British soldier in the South African War, by the addition of a pipestem from a broken brier pipe. It is claimed that the calabash makes the mildest and coolest smoke to be obtained from pipes of any description. Some calabashes sell for over $20.

CALAIS, *ka la'*, FRANCE, the nearest French port to England, opposite Dover, and distant from it twenty-one miles across the English Channel. For six hundred years it has been in the paths of armies and the object of sieges; medieval bows and arrows and modern long range guns have alike been trained on it. It was a much-coveted objective of the German high command in the World War, and although the concussion from the great guns shook the town, it was practically undamaged.

In 1347 the English captured Calais, after a siege of eleven months by the armies of Edward III; the queen's entreaties saved her people, but they were expelled to give possession to the victors, who retained the place for about 200 years. In 1558 the Duke of Guise drove the English away, and it has since been French. A project to build a tunnel between Dover and Calais was abandoned soon after 1900, through mutual fears of the advantage either country might gain in case of war. In 1914 it was sadly needed.

Calais was one of the most important ports connecting English and French interests in the World War. It reached out by rail to the English-French-American system of defenses and of operations in Northern France, and millions of tons of munitions and millions of English soldiers passed through it during the war. It is a manufacturing town, and has large shipyards, but its greatest fame arises from its position as a landing place in France for tourists from the British Isles. Population, 1911, 72,322.

CAL'AMINT, a genus of plants, some species of which are known respectively by the names of mountain balm, catmint, basil

balm and wild basil. The first, also termed common calamint, has aromatic leaves, employed to make herb tea.

CAL'AMUS, a genus of plants, the stems of the different species of which are the rattan canes of commerce. The genus holds a middle station between the grasses and palms, growing like the former but with flowers like the latter. The species are principally found in the hotter parts of the East Indies. See SWEET FLAG.

CALCEOLARIA, *kal se o la're ah*, or **SLIPPERWORT**, a genus of ornamental plants. All the species are South American, but they are extensively cultivated in North America as garden shrubs or as house plants in pots. Most of them have yellow flowers, some have brownish-purple ones and some have the two colors intermixed, while others are white. The greater number in cultivation are hybrids and not true species. They get their name from the shape of the corolla, which resembles a broad, short, much inflated slipper.

CALCIMINE, *kal'si mine*, a compound of carbonate of lime, or whiting, and some sticky substance such as sizing glue or casein. A variant of the word is *Kalsomine*, but it has no standing. It is one of the commonest substances used in decorating walls and ceilings of houses, and may be procured white or in colors. Whitewash, made from caustic lime, is an entirely different substance.

The following directions for making calcimine have the approval of the United States Department of Agriculture:

> Take 16 pounds of dry Paris white (whiting), and pulverize till free of lumps, then mix with one gallon of boiling water. To this add one-half pound of white sizing glue after it has soaked for four hours in one-eighth gallon of cold water. The glue should be dissolved in a glue pot. Any tint desired may be given the calcimine by stirring liquid coloring into the stock. The above recipe will make about two gallons of calcimine weighing 12¾ pounds per gallon. It may be used at once, but is better after standing for half an hour. Ocher, cochineal and logwood are the materials usually used for tinting.

CALCINATION, *kal se na'shun*, the operation of roasting a substance or subjecting it to heat, generally with the purpose of driving off some volatile ingredients. It is the first step in the extraction of the majority of the common metals from their ores. In the manufacture of lime and cement, calcination is an essential process. The term was formerly also applied to the operation of converting a metal into an oxide or metallic calx; this is now called *oxidation*.

CALCITE, *kal'site*, a term applied to various minerals, all of which are modifications of crystallized carbonate of calcium. Calcite includes limestone, all the white and most of the colored marbles, chalk and Iceland spar.

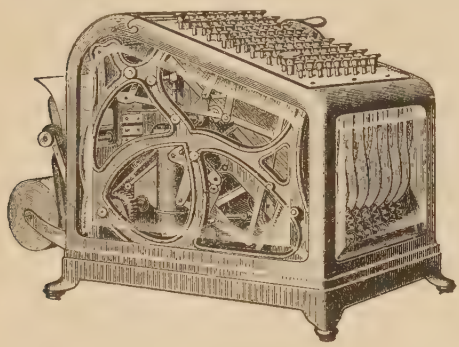
CALCIUM, *kal'se um*, in its pure state one of the rarest of substances, but in its combinations one of the most abundant and most widely distributed. It is a metallic basis of lime, and as a phosphate it forms the main part of the mineral matter of the bones of animals. As a carbonate it appears in chalk, limestone and marble, and as a sulphate it forms large deposits known as gypsum. Besides, it appears as a constituent in many minerals, such as fluorspar and Iceland spar, and is found in all soils, in the ash of plants, dissolved in sea water and in all springs. When quite pure it is a pale yellow metal with a high luster. It is about one and a half times as heavy as water, and is ductile and malleable. For the most part its salts are insoluble, or sparingly soluble, in water, but they dissolve readily in dilute acids.

CAL'CIUM CAR'BIDE, a compound of calcium and carbon, used extensively in making acetylene gas (which see). It is a hard, brittle solid, dark gray in color and of a crystalline structure. When first broken it shows a lustrous surface, but exposure to the air causes it to tarnish quickly. Calcium carbide was first discovered by Edmund Davy in 1836, but its commercial production on a large scale dates from 1894, when a new method was devised by a Canadian engineer, Thomas L. Willson.

CALCULATING MACHINES, also called ADDING MACHINES, are machines for performing various arithmetical operations. They have become essential in every well-conducted business, even to that of the small retail merchant. The latter class of business man particularly desires that form of calculating machine known as the cash register (which see).

Calculating machines are of many patterns. The simplest form is the register used on street cars. This contains a number of wheels, each of which bears the ten figures used in reckoning. When the cord which operates the register is pulled, the wheel representing units moves so as to mark the

number next higher than the one previously registered. In making a complete revolution, this wheel registers the 10 unit marks. At this point the second wheel is moved to mark 1. When the second wheel has marked



ADDING MACHINE

10, which would mean 100 for the first wheel, the third wheel marks 1, and so on.

Calculating machines used in banks, insurance offices and other places where computations are extensive, have a keyboard arranged something like that of a typewriter. The keys are arranged so that the numbers stand in columns from 1 to 9. When any key is pressed, it marks that figure upon a slip of paper. As many keys as the machine has columns can be pressed at once. The pressing of another key gives the result of additions or subtractions, and some machines have arrangements which will also give multiplications and divisions. The latest patterns of these machines are now operated by electricity.

CALCULUS, *kal'ku lus,* the h i g h e s t branch of mathematics. Its field is the investigation of the properties of variable quantities and especially of their rate of change. The following is a problem in calculus:

A man in a boat eight miles from the nearest point on a straight shore wishes to reach a point ten miles away from that point. He rows at the rate of four miles an hour and walks at the rate of five miles an hour. Where should he land in order to reach his destination in the shortest possible time?

Though calculus is a branch of the science of number it differs from algebra and arithmetic in that it regards number as continuous, or capable of increasing. Other number sciences are concerned with number that is discontinuous.

CALCULUS, in medicine, a general term for the stony formations which appear in various parts of the body, such as the bladder, the kidneys or the gall bladder. When the particles in the bladder are comparatively small, the disease is known as gravel. See LITHOTOMY.

CALCUTTA, *kal kut'ah,* INDIA, the metropolis of British India and capital of the presidency of Bengal, situated on the Hugli River, a branch of the Ganges, eighty-six miles from the sea. In population it is second to London among the cities of the British Empire, and until 1912 it was the seat of government of the Indian Empire. The city extends along the river bank for several miles, and is surrounded by populous suburbs, which include the large town of Howrah, on the opposite side of the Hugli, connected with Calcutta by a floating bridge 1,530 feet long. The houses of the south, or British, quarter of Calcutta are of brick and are well built, in striking contrast with those on the narrow, crooked ill-kept streets of the northern quarter, which is occupied by the natives.

Outside the city, between the river and the fashionable quarter, lies Fort William, the largest fortress in India, a magnificent octagonal structure, which cost altogether $10,000,000, mounts over 600 guns, contains 80,000 stands of arms and will hold 15,000 men. The plain between Fort William and the city forms a favorite promenade. At the north side, called the Esplanade, stands the former residence of the viceroy of India, or palace of the governor-general, built by the Marquis Wellesley, at an expense of $5,000,000. Other edifices worthy of notice are the town hall, supreme court, government treasury, writers' buildings, Metcalfe Hall, mint, theater, medical college, general post office, general hospital, the new cathedral and the old cathedral. There are also numerous educational institutions here.

Calcutta has an extensive system of internal navigation, through the numerous arms and tributaries of the Ganges, and it almost monopolizes the external commerce of Bengal. The city is also the terminus of three important railways systems. The principal exports are opium, cotton, rice, wheat, jute, gunny bags, tea, indigo, seeds and raw silk. Of the imports the most important are machinery, textiles, salt and liquor. Howrah is the center of the jute industry.

In 1686 a factory of the East India Company was established here, and in 1700 three adjoining villages were presented to the company by the emperor of Delhi. The settlement was then fortified and was called Fort William, in honor of the king of England, but subsequently it received its present name, which had been that of one of the villages. Calcuttâ was made the capital of a presidency in 1707, but it first figures in history in connection with the events of 1756. In that year it was attacked suddenly, and taken on June 20 by Surajah Dowlah, then nabob of Bengal. The 156 white men of the garrison were imprisoned in the famous Black Hole, and nearly all lost their lives through suffocation (see BLACK HOLE OF CALCUTTA). Eight months later Clive and Admiral Watson recaptured Calcutta, which soon afterward entered on its modern career of prosperity. The town became the general seat of government of British India in 1773, but in 1912 the British government removed the capital to Delhi, the original capital. Population, 1911, including suburbs, 1,222,313.

CALEDO'NIA, the name by which the northern portion of Scotland and its inhabitants first became known to the Romans, when in the year 80 Agricola occupied the country up to the line of the Firths of Clyde and Forth. He defeated the Caledonians in 83, and again at Mons Grampius in 84, in a battle of which a detailed description is given by Tacitus. The Caledonians became the Scots and Picts of early English and Scotch history. The name Caledonia is often used for Scotland as a whole, as in Scott's invocation to Scotland in the *Lay of the Last Minstrel.*

CALEDONIAN CANAL, a waterway passing through Glenmore, or the Great Glen, of Scotland, connecting the Irish Sea and the North Sea. It consists of a chain of lakes and artificial canals joining them, the latter having an aggregate length of twenty-three miles. There are twenty-eight locks, eight of which constitute a series near the western terminal. These are known as "Neptune's Staircase." The canal is navigable for ships of 600 tons and less, and is chiefly used by summer excursion boats and fishing craft.

CALENDAR, a record or register showing the division of time into years, months, weeks and days. The name is derived from the word *calends* (or *kalends*), which was the first day of the Roman month (see KALENDS). On this day it was the custom among the Romans for the *pontifex maximus* to call out or proclaim the month and the festivals to be observed during the month. The first division of time resulted from the regular occurrence of certain phenomena of nature; for instance, the changes of the moon suggested the division into months, making the months of twenty-nine or thirty days' time. Then the regular motion of the sun and the occurrence of the seasons divided time into years. The division into weeks, the only division not based on natural causes, was based on the observation of the law of Moses, which decrees the seventh day as the day of rest.

The year of the Jews consisted of twelve lunar months, with the thirteenth month inserted, when necessary, in order to accommodate it to the sun and the seasons. The Greek year had twelve lunar months of thirty and twenty-nine days, alternately. This made the year have 354 days, but a change was made later by which a month of thirty or twenty-nine days was introduced every other year. Still later another change was made by which the intercalary month was omitted once in about every eight years, making the average year have 365¼ days. The Greek month was divided into three decades of ten days each.

The Romans divided their year into ten months, but in the course of time this was changed to twelve months, making 355 days, and an intercalary month was sometimes introduced. The general confusion of this calculation led Julius Caesar to remedy the arrangement by the use of the Julian calendar, in which the year has 365 days and every fourth year, or leap year, 366 days, making the average year have 365¼ days. This calendar remained in use among the Romans until 1582, when it was found that the vernal equinox took place ten days earlier than its date in the calendar. Pope Gregory XIII remedied this error of time in the Gregorian, or Reformed, calendar, the one which is in use to-day. Pope Gregory ordained that ten days be subtracted from the year 1582, and every hundredth year, as 1600, 1700 and 1800, should be a common year and not a leap year, as in the old calendar, but every fourth hundred, as 2000, 2400, 2800 and so on, should be a leap year. The new calendar was adopted in Spain, Portugal, Italy and

France, and the other countries, Switzerland, Germany, the Netherlands, Poland, Hungary, Holland and Denmark, followed in succession. It was not until 1752 that the Gregorian calendar was adopted in England, with the commencement of the year set on January first. Sweden followed England in 1753. Those countries following the communion of the Greek Church still retain the old Julian calendar, which differs twelve days from the new.

A Change Discussed. In 1916 a movement was started in the United States for an official change in the calendar for the purpose of increasing industrial efficiency. The proposed changes would do away with the confusion over varying numbers of days in different months and the constant changes of calendars. A year of thirteen months was proposed, with twenty-eight days to the month. All months would begin on Sunday, and between the end of one year and the beginning of the next one there would be an extra day, always to be a holiday. On leap years there would be two extra days—that is, the one between the years, and another one, coming in the middle of a wholly new month. This new month would fall between June and July, and the name suggested for it is Exember. Holidays would fall next to Sundays, or else on Wednesdays, and Easter day would occur always on April 15, without regard to phases of the moon.

CALGARY, *kal'ga ri*, ALBERTA, the largest city of the province, in 1916 a little larger than Edmonton, the provincial capital. It is larger than any other Canadian city west of Winnipeg, except Vancouver. The town was founded in 1876, and named for an estate in Scotland; the word means *clear running water*. It is nearly surrounded by the Bow and Elbow rivers. In 1901 the population of Calgary was only 4,392; ten years later it was 43,704; the provincial census of 1916 gave it 56,302 people, making it eighth in size among the cities of the Dominion. The population is largely Canadian and American.

Calgary is 194 miles south of Edmonton, 811 miles east of Victoria, B. C., 860 miles west of Winnipeg, and 1,215 miles northwest of Duluth, Minn. The three great transcontinental railroads of Canada—the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific—serve the city. Branch lines radiate in all directions. The railroads maintain large repair shops here.

The industries are extensive and varied; chief among them are meat packing, milling, leather manufacture, planing mills, brick and tile yards, carriage and wagon works and foundries. There are twenty-one banks, a fine Dominion building, thirty-four public schools and six parochial schools, four colleges and three business colleges. The Hudson's Bay Stores, the *Herald* block, an insurance building and a great hotel are important and expensive structures. There are six hospitals and a large public library.

Calgary is ideally located as a manufacturing and industrial center. It has within a radius of a few miles a sufficient supply of anthracite, bituminous and lignite coal, also an abundant natural gas supply, to supply cheap power for centuries to come. The marvelous growth of the Canadian West furnishes the manufacturer with a large market in which to dispose of his wares. The city is also one of the distributing centers of 165,000 square miles of the richest and most productive soil in America. The surrounding district produces grain and grasses, and sustains horses, beef and dairy cattle, sheep and hogs.

The commission form of government was adopted in 1909. The city owns its street railways, light and power plants, waterworks, a municipal market and a municipal paving plant. There are ten parks, the largest, Victoria Park, containing 103 acres.

CALHOUN, *kal hoon'*, JOHN CALDWELL (1782–1850), an American stateman who was a great national figure during that notable period in which Clay and Webster also rose to fame. This renowned trio of orators were the master minds of American political history for two score years, and more. Webster was the spokesman for the North and for union; Clay was the advocate of compromise; Calhoun sturdily upheld the cause of states' rights. He was born in South Carolina, of Scotch-Irish descent. Because of poverty, he received little early education, but by arduous study and by the help of his brother-in-law, he was able to enter Yale College as a junior and

JOHN C. CALHOUN

was graduated with high honors in 1804. After a brief career as a lawyer in Abbeville, S. C., he was elected to Congress in 1811, and there became conspicuous as both orator and statesman. At first he was a warm follower of Henry Clay and was a strong nationalist in his views, favoring a powerful navy, the United States bank and a protective tariff. In 1817 he was made Secretary of War and displayed remarkable ability.

Calhoun was elected Vice-President with John Quincy Adams in 1824, but during this administration his views gradually changed, and he was elected Vice-President with the radical Democrat, Andrew Jackson, in 1828. In this year also he became a prominent opponent of the protective tariff, as a representative of the agricultural states of the South, and prepared a famous paper affirming the right of a state to refuse to submit to any law of Congress which it considered unconstitutional. This led to a separation of interest between Calhoun and Jackson, which became constantly more marked until it culminated in the open contest over nullification in 1833. Calhoun urged nullification as a state right; Jackson took the opposite view, and by a firm and prompt display of Federal authority he succeeded in putting down the sentiment both for secession and for civil war.

For the rest of his life Calhoun was a powerful advocate of states' rights and, incidentally, of slavery, for it was upon the question of slavery, chiefly, that the states found themselves at odds with the Federal government. As a member of the Senate from 1832 to 1843 he supported President Van Buren's subtreasury scheme, denounced the tariff of 1842 and supported the Webster-Ashburton Treaty. In 1844 he was appointed Secretary of State by President Tyler, and was partly responsible for the annexation of Texas and indirectly for the Mexican War, though he opposed the latter. He again entered the Senate in 1845, and from that time on he was prominent chiefly as an ardent advocate of slavery and the Southern cause. His last speech was in favor of the Compromise of 1850, but it was read, on account of his illness, by a colleague.

During his last months Calhoun wrote his famous *Disquisition on Government* and his *Discourse on the Constitution and Government of the United States*, remarkable discussions of constitutional questions. His personality, character and bearing were exceedingly attractive, and as orator and statesman he possessed abilities which have rarely been equaled in America, but he was led to advocate an impossible doctrine, namely, the construction of a powerful federal nation whose constituent states were practically independent.

CALICO, *kal'i ko*, **AND CALICO PRINTING.** By *calico* is meant any inexpensive cotton fabric having designs stamped in color. A distinctive name is given to certain varieties of calico, such as percale and cretonne, but these fabrics come within the meaning of the definition given.

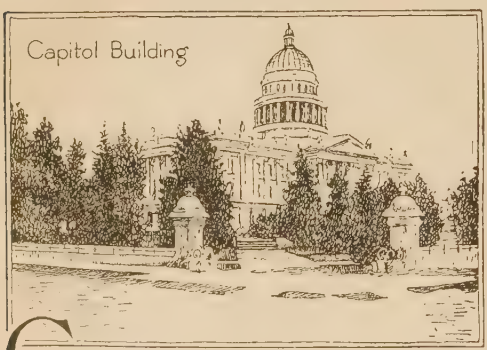
Calico Printing, the name given the process of stamping the patterns on the cloth. Originally the patterns were carved on blocks of wood, which were laid on the cloth by hand. Each block contained the portion of the figure which impressed a single color, and great care was necessary in laying on the blocks, so as not to mar the pattern.

Calico printing is now done by a printing press which in its general plan and structure somewhat resembles the cylinder press used for printing paper. The important parts of this press are a large cylinder, or drum, around which the cloth passes, and several smaller copper cylinders upon which the pattern is engraved, and which are so placed that as the cloth passes around the drum, the portion of the pattern upon each cylinder is impressed upon the cloth. Each of the engraved cylinders is supplied with coloring matter by contact with a wooden cylinder covered with cloth and dipping into a trough containing the dye.

The figures are engraved upon the cylinder either by pressing them against a cylinder of hard steel, upon which the pattern is cut in raised figures forming dies, or by etching with acid. By either process the pattern is sunk into the surface of the engraved cylinder. When brought in contact with the dye, the figures are filled with the substance, and a steel plate called the *color doctor* presses against the surface and removes all dye except that in the sunken figures forming the patterns. As the cloth is pressed against the cylinder it absorbs the dye from these figures and thus has the pattern stamped upon it. Each color or tint requires a separate cylinder, and, by increasing the size of the drum,

as many as twenty colors can be used at a time. The engraved cylinders are so adjusted that the different parts of the pattern will fit to one another.

Calico printing is done by three methods, known as *direct printing, combined printing and dyeing* and *discharge and reserve* methods. By the first method, the pattern is stamped directly upon the cloth in the colors which it is intended to contain. This method is now but little used, because the goods printed by it fade quickly. The combined printing and dyeing method makes use of mordants (see DYEING) and is subject to a great many variations. It is based upon the principle that the same dye, when treated with different mordants, will produce different colors. By this method the mordants are stamped upon the cloth, and it is then dipped in a dye, after which the colors are fixed by exposure to air or to steam heat. This method produces what are known as *fast colors,* that is, colors that will not fade. The discharge and reserve method consists in treating the cloth so that certain portions of it are white when the process is completed. This is done either by stamping upon the cloth some substance, such as clay or wax, that the color will not penetrate, or by stamping upon certain parts of the figure a substance which, when moistened, will dissolve the color. Most of the patterns in blue and white are printed in this way.



CALIFORNIA, popularly called THE GOLDEN STATE, is the largest of the Pacific coast states and the second largest state in the Union. Texas, with an area of 265,896 square miles, alone surpasses it in size; with an area of 158,297 square miles, California could contain almost 127 states the size of Rhode Island. Of the total area, all but 2,654 square miles constitute land surface. The state lies along the Pacific coast from Oregon to Lower California. It is irregularly oblong in shape, and is over three times as long as it is wide. With a north and south length of 750 miles, it is the longest state in the Union with the exception of Texas, and its coast line of more than 1,000 miles is very nearly equal to that of Florida. California is exceeded in population by eleven states. In 1910 the population was 2,377,549, but this had increased to 3,039,032 in 1917, by Federal estimate.

There is probably no American commonwealth which overshadows the "Golden State" in interest and popularity. The balmy climate of the greater part of the state, its towering mountains with their forest-clad slopes, its wealth of fruits and flowers, its rich mines of gold—all of these features have given California a very definite place in the mind and heart of the average American. The name "Golden State" refers to the historic discovery of gold in 1848, but there is much of romantic association in the name, as well. As for the origin of *California,* some say that the name comes from that of a mythical island in the Pacific, while others liken it with the Spanish *caliente forno.* These words mean *hot furnace,* and were used in pioneer days to designate the hot regions in the south.

Surface and Drainage. The Sierra Nevada Mountains extend along the eastern boundary for nearly the entire length of the state, and west of these and nearly parallel with them is the Coast Range. At the north these are connected by spurs of the Cascades, which contain a number of prominent peaks, among them Mount Shasta, far-famed for its grandeur and beauty. To the south these ranges are connected by the Tehachapi Mountains. Within this mountain enclosure is a large plain over 400 miles long and having an area of about 18,000 square miles. The surface is mostly level and the soil fertile, making this plain one of the most valuable agricultural regions in the world. The plain is divided into the Sacramento and the San Joaquin valleys, each being occupied by its respective river. Between the spurs of the Coast Range, the foothills and the Sierra Nevadas are numerous fertile valleys, sheltered from wind and fog. When supplied with water these valleys produce abundant crops of semitropical fruits and of veg-

etables, for which this part of the state is famous.

South of the Tehachapi Mountains is that part of the state usually known as Southern California. The region is more or less broken, but the mountains are not so high as those farther north. Near the southern boundary is one of the most remarkable depressions in the world, Death Valley, whose surface is in some places more than 250 feet below sea level. This valley was once the bed of a salt lake.

This blending of mountain, plain and valley gives to the scenery of California grandeur and beauty which must be seen to be appreciated. The state contains forty-one peaks exceeding 10,000 feet in altitude, and eleven exceeding 13,000, while Mount Whitney, 14,898 feet, is the highest peak in the United States. Almost as lofty is Fisherman Peak, one of the lesser elevations of Mount Whitney, with an altitude of 14,448 feet. The best known and most famous peak is Mount Shasta, 14,380 feet. The western slope of the Sierra Nevadas contains many deep canyons in which are found rushing streams and beautiful cascades. Among these is Yosemite Valley, most famous because it is the most accessible, though it would have a number of rivals were they equally well known. Mountain lakes remarkable for the purity of their water are of frequent occurrence. Lake Tahoe, between California and Nevada, and a number of others rival the famous Swiss lake in beauty.

The great valley in the interior is drained by the San Joaquin and Sacramento rivers, which unite before they enter San Francisco Bay. Each of these is navigable for a considerable distance. Among the mountains and foothills are found numerous rapid streams, which are fed by melting snows and are used either for irrigation or for the production of electric power. West of the Coast Range the Salinas River waters the west-central portion of the state, and in the north are the Klamath and the Eel.

Climate. The climatic advantages of California are known to everyone who has heard the name of the state. For those who dislike extremes of heat and cold the greater part of the state is delightful summer or winter. California extends from the latitude of Savannah, Ga., to that of Boston, Mass., but the climate is entirely different from that of the Eastern states included between these parallels. The variations in temperature are due to altitude rather than latitude, and the climate in the northern end of the state is as mild and salubrious as in the southern. The great central valleys are so protected by the mountains that the same fruits grow in the north as in the south. Except upon the high elevations, live stock can remain out of doors throughout the year, and there is always sufficient grass for grazing. Roses and other flowers blossom the year round, and oranges, lemons and other semitropical fruits are raised in the valleys.

The high altitudes of the Sierra Nevadas have a cool climate, and the highest peaks of this range are covered with perpetual snow. Instead of being divided into winter and summer, the year is characterized by wet and dry seasons, the former lasting from October to April, and the latter occupying the remainder of the year. The rainfall varies in different localities. In the mountainous regions and the San Joaquin and Sacramento valleys it is sufficient for nearly all agricultural purposes, though certain localities are greatly benefited by irrigation; but south of the Tehachapi Mountains the rainfall is very light and irrigation is necessary to successful tillage.

Minerals and Mining. Though California does not at present produce anywhere near the amount of gold that was mined during the first decade after the discovery of 1848, it still holds first place with Colorado among the gold-producing states of the Union. Over 1,000,000 fine ounces, valued at about $21,000,000, represent the average annual yield of this rare metal. Silver, too, is mined, though California is surpassed in this metal by a number of Western states. Over 43,000,000 pounds of copper are produced in average years, and there are also workable deposits of lead, zinc and clays. California produces about two-fifth's of the world's quicksilver yield, and is rapidly becoming a foremost petroleum center, ranking second only to Oklahoma in this valuable product. The yearly output is steadily increasing and is approaching the 100,000,000-barrel mark. Death Valley is a valuable storehouse of borax, in which California holds first place, and tungsten is obtained in paying quantities in the Mohave Desert.

Agriculture. Though one thinks of California primarily as a fruit state, there are scarcely any of the products of the temper-

ate or semitropical sections that cannot be raised in its fertile valleys. The wheat yield is over 7,000,000 bushels a year in favorable years, and oats, corn, hay and potatoes are all profitable crops. Among field vegetables beans are raised in great quantities, the crop averaging nearly 9,000,000 bushels a year. In this product California ranks first. Cotton, which is now being raised in the irrigated sections of the Imperial Valley, in the south, reached a production of 68,000 bales in 1918, and in the same year there were 80,000 acres of irrigated land devoted to rice. Sugar beets are also a valuable product, and in their production California is one of the leading states.

Fruit raising has a place of paramount importance. California produces two-fifths of the world's supply of oranges and more than three-fourths of those grown in the United States. Lemons and grape fruit, olives and raisin grapes, plums, peaches, apples, pears, cherries, figs, quinces, berries, wine grapes, prunes and apricots are all successfully grown. The raisin crop is now about three times that of Spain, the home of the raisin industry, and it has reached a total of 250,000,000 pounds a year. Walnuts and almonds are other important products.

Irrigation. At least one-fifth of the cultivated area is irrigated land, and the acreage is constantly increasing, especially in the Sacramento River and Imperial valleys. Water is derived from streams and from wells. The United States Reclamation Service opened several wells in Death Valley in 1918, making the name of that region not quite so appropriate as formerly. The Service is also constructing a great reservoir at Yuma, Ariz., which will provide irrigation facilities for thousands of acres in California.

Stock Raising. This branch of agriculture is less important now than in pioneer days, but the raising of cattle, horses, sheep, mules and hogs is still carried on to a considerable extent. Poultry raising is of great importance in the vicinity of Petaluma.

Manufacturing. The opening up of the petroleum wells has offset what was formerly a drawback to the development of manufacturing—the lack of accessible coal. Within recent years both oil and electricity have come largely into use as power, and California has many profitable lines of manufacture. Of first importance is the lumber industry, especially the manufacture of the famous redwood shingles. The state holds sixth place among the lumber states of the Union, and the yearly output of timber products has a value approximating $45,000,000. Meat packing, the canning of fruits and vegetables, flour making, printing and publishing, the manufacture of wines and olive oil and sugar refining are the other manufacturing industries of importance. Shipbuilding received a decided impetus after America entered the World War. National prohibition will doubtless destroy the wine industry.

Other Industries. The pleasant climate of the state and its beautiful scenery yearly attract thousands of visitors, and taking care of the tourists is a very profitable industry. The beaches and resorts along the coast are world famous, and they possess some of the finest hotels on the globe. That same climate has been utilized by some of the largest moving-picture corporations, for the clear air and sunshine afford ideal conditions for the filming of outdoor scenes. Scores of studios may be found in the vicinity of Los Angeles, and Hollywood, a suburb, is a typical moving-picture colony. Universal City, the largest motion-picture plant in the world, is a real city with a population of over 1,500 (see MOVING PICTURES).

The fisheries of California also deserve comment. San Francisco is the world's leading whaling port, and the state holds high rank in the catching and canning of salmon. Of late years, especially since 1916, the tuna fish industry has been rapidly developing along the coast. The coast water also supplies sturgeon, smelt, halibut, sole, mackerel, cod, bass, red snapper and pompano, while the mountain streams abound in trout, black bass and shad. Of the shellfish, oysters, clams, mussels, crabs, shrimps and crawfish are caught in considerable numbers.

Commerce and Transportation. California possesses the largest bay on the Pacific coast and one of the greatest harbors in the world, in San Francisco Bay. Ships from every quarter of the globe may be seen here, and in normal years the annual foreign trade has a value approaching $100,000,000. Inland water transportation is practically limited to the San Joaquin and Sacramento rivers, and is secondary in importance to railway transportation.

The state is traversed by more than 5,600 miles of main lines, and the principal roads have many branches, giving the people excellent railroad facilities. California is entered from the south by two transcontinental lines—the Atchison, Topeka & Santa Fe and the Southern Pacific. Other important roads operating in the state are the Northwestern Pacific, the Western Pacific, and the California & Southern. An excellent system of electric lines, with more than 1,600 miles of trackage, enables the traveler to view at close range extensive sections of this beautiful state.

Government. The legislature consists of a senate of forty members, elected for four years, and an assembly of eighty members, elected for two years. Sessions are held biennially. The executive power is vested in a governor, lieutenant-governor, secretary of state, attorney-general, comptroller, treasurer and surveyor-general and superintendent of public instruction, each of whom is elected for four years. The supreme court consists of a chief justice and six associates. The other courts are district courts of appeal, superior courts and justice courts. The present constitution was adopted in 1879, but in 1911 twenty-one amendments were adopted. Among these were an amendment giving women equal suffrage rights with men and one providing for the initiative and referendum.

Education. The state maintains one of the best public school systems in the Union and has always been known for the high standard of qualifications demanded of its teachers. The schools are provided with funds through a system of state taxation, and in addition to the common schools there are high schools in the cities and towns; union district high schools take care of pupils in the rural sections. Eight state normal schools are at Arcata, Chico, Fresno, Los Angeles, San Diego, San Francisco, San José and Santa Barbara. At the head of the educational system is the University of California at Berkeley. Leland Stanford, Jr., University at Palo Alto is another institution of highest rank (see CALIFORNIA, UNIVERSITY OF; LELAND STANFORD JUNIOR UNIVERSITY).

Institutions. The charitable institutions include asylums for the insane at Agnew, Napa, Stockton and Ukiah; the school for the deaf, dumb and blind at Berkeley; a home for feeble-minded children at Eldridge; and a home for adult blind at Oakland. At Ione is the Preston School of Industry. The penal institutions include prisons at Folsom and San Quentin and a state reform school at Whittier.

Cities. California has twenty-two cities with populations in excess of 10,000. The first five, in order of size, are Los Angeles, San Francisco, Oakland, Sacramento (the capital) and Berkeley.

History. California was visited by the Spaniards in 1533, but the first exploration within the bounds of the present state did not occur until 1542, when Cabrillo visited the vicinity of Santa Barbara. In 1597 Sir Francis Drake explored the coast as far north as the forty-third parallel and named the country New Albion. The first Spanish mission was founded in 1769 at San Diego, and by 1821 twenty-one missions were in successful operation. In 1777, the Spaniards began the establishment of towns, which after the Mexican revolution in 1821 gradually increased and expanded.

The first American emigrant wagon reached the state in 1826. During the Mexican War the American forces under Colonel Fremont and Commodore Sloat took possession of Sonoma, San Francisco and other important posts. An attempt was made at Sonoma to organize a republic, but by the Treaty of Guadalupe-Hidalgo the territory became a possession of the United States. On January 24, 1848, gold was discovered at Sutter's Mill, near Coloma. The news of this discovery led to a rapid influx of settlers from all parts of the world, and in 1849 the population exceeded 100,000. Several attempts were made to form a state constitution, and finally, in 1849, a constitution which prohibited slavery was adopted; on September 9, 1850, California was admitted as a free state under the compromises of that year (see COMPROMISE OF 1850). The completion of the Union Pacific Railway in 1869 placed the state in closer communication with the east, and since then its development has been rapid.

Of more recent events the most spectacular was the great earthquake of 1906, as a result of which most of the business section of San Francisco was destroyed by fire. The Panama-Pacific Exposition at San Francisco and the Panama-California Exposition

Items of Interest on California

Within California there are four national parks, a striking tribute to the scenic attractions of the state. These parks are Lassen Volcanic Park, containing the only active volcano in the United States; Yosemite Park, in the lovely Yosemite Valley; Sequoia Park, the home of some of California's giant trees; and General Grant Park, another reservation of primeval sequoias.

Life in the mining camps in the pioneer days has been graphically told by Bret Harte in *The Luck of Roaring Camp, The Outcasts of Poker Flat* and similar stories.

Before the construction of railroads in the Far West mail was carried from Missouri to San Francisco by the "Pony Express," and the trip took ten days.

In the Mariposa Grove, just south of the Yosemite National Park, a roadway has been cut through one of the standing redwoods, the opening being large enough to allow the largest coach to pass through; a single redwood has been known to yield 100,000 feet of lumber.

Redlands is one of the most famous orange-growing and shipping centers in the world; it also ships lemons, limes, grapefruits, olive oil, wheat and barley.

At Sebastopol, near Santa Rosa, is the great experiment farm of Luther Burbank, where fruits, trees and flowers of extraordinary character are grown.

Occasionally rain falls in the Mohave Desert, and when it does the land is soon covered with flowers of every color. These have but a brief existence, for after a few days of dry weather they wither and die.

In 1905 and 1906 a great sea was formed in the Imperial Valley through the flooding of the Colorado River. The waters filled up the basin of an extinct lake which became known as the Salton Sea. Subsequently the sea disappeared through evaporation.

The state flag of California, adopted in 1911, has a white background, on which is pictured a brown grizzly bear. A red star appears above and a red stripe below. The flag bears the words "California Republic."

The sequoias, the largest and oldest living objects on the globe, grow nowhere but in California. There are two species, the "big trees" and the redwoods.

There are at least 1,500 glacial lakes in the mountains of California, and most of them are more than a mile and a half above the sea.

The mountain scenery in all parts of the state is beautiful, but undoubtedly the most wonderful is the scenery of the Yosemite Valley.

Death Valley, near the eastern boundary, below sea level and surrounded by high, barren mountains, produces nine-tenths of the annual output of borax of the United States; in one part it is nearly 500 feet below sea level, the lowest point in the United States.

The Colorado desert, in the southern part of the state, is the hottest part of the United States; along the line of the Southern Pacific the maximum is frequently 130 degrees in the shade, which is probably the greatest heat ever recorded in any part of the world.

Questions on California.

How does California compare with Texas in area? With Rhode Island?

What can be said of its coast line?

What is California's rank in population? At what rate is the population increasing?

What gave the state its popular name?

Where is the highest peak in the United States?

How does California rank in the production of gold? Quicksilver? Petroleum? Borax? Oranges?

Why is the state a center of the moving-picture industry?

What city has the largest harbor on the Pacific coast?

What two great expositions were recently held in California?

What effect did the discovery of gold have on the history of the state?

CALIFORNIA

THE GOLDEN STATE

HISTORY

DISCOVERED BY SPANIARDS 1542
EXPLORED BY ENGLISH DRAKE 1597
FIRST SETTLEMENT SANDIEGO 1769
GOLD DISCOVERED 1848
CEDED TO UNITED STATES 1848
ADMITTED TO THE UNION 1850
UNION PACIFIC RAILROAD COMPLETED 1869

GEOGRAPHY

AREA 155,980 SQUARE MILES
EQUAL TO 20 OF MASSACHUSETTS
EQUAL TO 3 OF ILLINOIS
LENGTH 720 MILES
WIDTH 200 MILES
COAST LINE 1200 MILES

PRODUCTS

FIRST IN VARIETY OF PRODUCTS
FIRST IN PRODUCTION OF FRUITS
SECOND IN PRODUCTION OF PETROLEUM
SECOND IN PRODUCTION OF GOLD
SECOND IN PRODUCTION OF BARLEY

INDUSTRIES

FRUIT RAISING AND CANNING
TRUCK GARDENING AND HOP GROWING
PRODUCTION OF PETROLEUM
MINING

EDUCATION

PUBLIC SCHOOL SYSTEM AMONG THE BEST
STATE UNIVERSITY
LELAND-STANFORD JR UNIVERSITY
LICK OBSERVATORY

1, State Flower.
2, Peaches.
3, Pears.
4, Grapes.
5, Plums.
6, Apricots.
7, Almonds.
8, Apples.
9, Orange Tree.
10, Ostriches.
11, Olives.
12, Palm Tree.
13, Branch of Lemon Tree.
14, Figs.
15, Vegetables.
16, Hydraulic Mining.
17, Big Tree.
18, Mount Shasta.
19, California Roses.

M. J. M. MASTER

at San Diego brought the state into world-wide prominence in 1915.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Alameda
Bakersfield
Berkeley
Cascade Range
Coast Range
Death Valley
Eureka
Fresno
Golden Gate
Long Beach
Los Angeles
Mare Island
Oakland
Parks, National
Pasadena
Pomona
Redlands
Riverside
Sacramento
Sacramento River
Salton Sea
San Bernardino
San Diego
San Francisco
San Joaquin
San Jose
Santa Ana
Santa Barbara
Santa Cruz
Sierra Nevadas
Stockton
Vallejo
Yosemite Valley

HISTORY

Burbank, Luther
Gold
Johnson, Hiram
Mexican War
Panama-Pacific International Exposition

CALIFORNIA, Gulf of, an arm of the Pacific Ocean, on the west coast of North America, lying between the peninsula of Lower California and the mainland of Mexico. It is about 700 miles long, in width it varies from 70 to 150 miles, and in depth, from 600 to 6,000 feet. The Colorado River is the most important stream flowing into it. Valuable pearl fisheries are found on the western shore. It was formerly known as the Sea of Cortez, having been first explored by Cortez. The principal cities on its shores are Mazatlan and Guaymas, Mexico.

CALIFORNIA, Lower. See Lower California.

CALIFORNIA, University of, a state university established at Berkeley, in 1868, in student enrollment ranking second to Columbia among American universities. It occupies a beautiful campus on the lower slopes of Berkeley Hills. Here are maintained the colleges of arts and sciences, commerce, agriculture, mechanics, mining, civil engineering and chemistry; the schools of architecture, jurisprudence and education, and the University Extension division. In San Francisco are the Mark Hopkins Institute of Art, the Hastings College of Law, the medical department, postgraduate medical department, dental department and California College of Pharmacy; and on Mount Hamilton, in Santa Clara County, the astronomical department, which contains the Lick Observatory (which see). Other branches of the institution include the Scripps Institution for Biological Research at La Jolla, the Graduate School of Tropical Agriculture at Riverside, the University Farm at Davis, and the D. O. Mills Observatory at Santiago, Chile.

California University has endowment funds aggregating about $5,500,000, and its grounds and buildings have an approximate value of $10,870,000. Tuition is free to residents of California. Among the generous benefactors of the university Mrs. Phoebe A. Hearst had a leading place. The Hearst Memorial Mining Building, costing $644,000, is one of several imposing buildings erected under the Hearst plan of obtaining designs through an international architectural competition. Another of the group of fine buildings is the Greek Theater, an open-air structure in a grove of eucalyptus trees. The university has a teaching force of over 650, and in normal years nearly 12,000 students (including summer school) are in attendance. The great library, which includes the historical collection of Hubert H. Bancroft, contains nearly 400,000 volumes.

CALIGULA, *ka lig'u la*, Gaius Caesar Augustus Germanicus (12–41), the third emperor of Rome, the youngest son of Germanicus, and the nephew of Tiberius, whom he succeeded on the throne in A. D. 37. In the beginning of his reign he made himself very popular by his mildness and his lavish expenditures, but at the end of eight months he was seized with a disorder which permanently affected his brain, and after his recovery his career was marked by a cruelty and licentiousness little short of madness. He even considered himself a god and caused sacrifices to be offered to himself. At last a band of conspirators had him assassinated.

CALIPERS, *kal'i perz*, an instrument designed to measure the diameter or the thickness of objects. The simplest form is a pair of ordinary dividers with the legs curved into bows. A more complicated form has a graduated arc attached to the dividers, so arranged that the distance between the points of the legs is accurately registered. What are known as micrometer calipers are used for measurements requiring a high degree of precision. See Micrometer; Vernier.

CA'LIPH, the name assumed by the successors of Mohammed in the government of the faithful and in the high-priesthood. *Caliphate* is therefore the name given to the empire of these princes, which the Arabs founded in Asia and enlarged within a few centuries to a dominion exceeding even the Roman Empire in extent. *Shah, sultan, emir* and other titles peculiar to the East have taken the place of caliph.

CALISTHEN'ICS, the art or practice of exercising the body for the purpose of giving strength to the muscles and grace to the carriage. The term is usually applied to the light systematic exercises that may be performed without any apparatus, or by use of such light apparatus as Indian clubs, dumb-bells and wands.

CALIXTUS, *ka lix'tus,* the name of three Popes. CALIXTUS I was a Roman bishop from 217 to 224, when he suffered martyrdom.

Calixtus II, Guido of Vienne, Pope from 1119 to 1124, was a son of the Count of Burgundy. In the second year of his reign he expelled the antipope Gregory VIII from Rome. In 1122 he concluded with the German emperor, Henry V, the famous Concordat of Worms.

Calixtus III, Alonso Borgia, was Pope from 1455 to 1458. Though aged and feeble, he tried to institute a crusade against the Turks, but failed. An antipope, created by Frederick Barbarossa in 1178, and calling himself Calixtus III, opposed Alexander III for nine years.

CALKING, *kawk'ing,* driving a quantity of oakum into the seams of the planks in a ship's decks or sides, in order to prevent the entrance of water. After the oakum is driven very hard into these seams, it is covered with hot, melted pitch, or with cement or putty, to keep the water from rotting it. The joints of iron plates are also rendered water-tight by calking.

CALLA, *kal'a,* the name of two different kinds of plants, one of which, a native of North Africa, is known there as the Ethiopian lily, but elsewhere as the calla lily. It is really not a lily at all, but it is very popular because of the beautiful pure white spathe that surrounds the small greenish flowers. The other calla is a small flower that grows in the bogs of Northern Europe and America. It has large heart-shaped leaves and a white spathe. From the root a starch used as a food is produced. See ARUM.

CALLAO, *ka lyah'o,* PERU, the chief seaport of the country, and capital of a province of the same name, situated on Callao Bay, seven miles west of Lima. The city is divided into the old and the new towns, the latter having good streets and the conveniences of a modern city. The leading manufactures are sugar, hides, lumber and iron. Callao has one of the best harbors on the Pacific and is an important commercial port. Nearly all the exports and imports of Peru pass through it, and more than 1,100 ships enter and clear from its docks each year. Population, about 40,000.

CALLING HARE. See PIKA.

CALLIOPE, *ka li'o pe,* a mechanical musical instrument associated with circus parades. The sounds are produced by means of a series of steam whistles. They are loud and harsh and extremely disagreeable to a sensitive ear. A somewhat popular vaudeville act of recent years is an imitation of the calliope by a number of human voices.

In classic mythology Calliope was the muse of epic poetry (see MUSES). According to one legend she was the mother of Orpheus by Apollo.

CALMS, *kahmz,* REGIONS OF, the regions in the Atlantic and Pacific oceans where there is no wind for long periods of time. The region of tropical calms lies just outside the belt of trade winds in each hemisphere. It is caused by the mingling of the warm and cool atmospheric currents in these latitudes, and their consequent equality of density. The region of tropical calms follows the sun in its yearly course, being farther north in summer and farther south in winter. The region of equatorial calms is at the equator, where the current is always upward. This also moves north and south with the sun. The tropical calms of the northern hemisphere are frequently known as the calms of Cancer, and those of the southern hemisphere are called the calms of Capricorn. See HORSE LATITUDES; WIND.

CALOMEL, *kal'o mel,* a preparation of mercury much used to counteract the effects of malaria. It is a white, tasteless powder, practically insoluble, and is a powerful cathartic. From one-half of a grain to ten grains may be given in a dose but overdoses produce a species of poisoning that shows itself in a swelling of the gums and an abnormal flow of saliva. It should never be taken except as prescribed by a reliable physician. Calomel is prepared by grinding sulphate of mercury in a mortar with an equal quantity of mercury, and heating the compound with common salt in a retort until the sublimation of the mercury occurs.

CALORIE, *kal'o ri,* or **CALORY**, a unit employed in measuring quantities of heat. The term is heard frequently in connection with the fuel values of food. For example, in estimating the heat value of salt pork, we say that it has a value of 3,555 calories per pound. A calorie is the amount of heat required to raise the temperature of one kilo-

gram of water one degree centigrade, or one pound of water four degrees Fahrenheit. See Food.

CALORIM'ETER, an apparatus for measuring absolute quantities of heat, or the specific of latent heat of bodies. Such an instrument may measure the heat given out by a body in cooling from the quantity of ice it melts, or from the rise of temperature it produces in water around it. See Specific Heat.

CALUMET, *kal'u met*, a famous kind of pipe formerly used by the American Indians on such occasions as the ratification of peace treaties. The bowl was made of white or red stone, and the tube was a long stem of wood or reed, decorated with feathers, quills or hair. The pipestone quarry mentioned in Longfellow's *Hiawatha* was the source of a red clay which the Indians of the Minnesota regions used in making the bowls of their calumets.

CAL'VARY, the name applied to the place outside Jerusalem where Christ was crucified, usually identified with a small eminence on the north side of the city. The term is also applied in Catholic countries to a kind of chapel, sometimes erected on a hill near a city and sometimes on the exterior of a church, as a place of devotion, in memory of the place where Jesus suffered. A rocky mound or hill on which three crosses are erected, an adjunct to religious houses, is also called Calvary.

CALVE, *kal va'*, Emma (1866–), whose real name is Emma de Roquer, is a celebrated operatic soprano, the most effective of all the stars who have portrayed the rôle of Carmen. She was born in France. Calvé made her début in *Faust*, in 1882, at Brussels, and thereafter sang with remarkable success in leading operatic rôles. She made her American début at New York in 1893, and repeated the success won at that time on several later tours, both in opera and in concert work. Though she was unsurpassed as Carmen, she also won high praise for her portrayal of the rôle of Santuzza in *Cavalleria Rusticana*, and the soprano rôles in *Sapho, Hamlet* and *Flora Mirabilis*.

CAL'VERT, George. See Baltimore, Sir George Calvert, Lord.

CAL'VIN AND CAL'VINISM. The founder of the system of theology known as Calvinism was John Calvin (1509–1564), a native of Noyon, France. He was educated in Paris, but became dissatisfied with the teachings of the Roman Catholic Church, and began the study of law in Orleans. In 1532 Calvin returned to Paris a decided convert to the Reformed faith, but he was soon compelled to leave on account of persecutions. After varied wanderings, he found a protector in Margaret of Navarre. In 1534 he returned to Paris, but in the autumn of the same year he retired to Basel, Switzerland, where he completed and published his great work, *The Institutes of the Christian Religion.*

After traveling for a time in Italy and other southern countries, he set out for Strassburg and on his way passed through Geneva, Switzerland. There he was prevailed upon by Farel, a prominent reformer, to remain and assist in spreading the doctrines of Protestantism. With Farel he soon accomplished a remarkable change in the character of the city, both of its people and of its government. A Protestant confession of faith was adopted by the city and was made binding upon all citizens. His arbitrary rule, however, made him enemies, and he was expelled from Geneva, but his friends succeeded in effecting his recall a few years later. Thereafter he built up in the city a theocracy, with himself at its head. It directed not only the religious and political affairs, but controlled the social and individual lives of the people. This was not accomplished without some difficulty, however, and Calvin was compelled to pass through numerous serious controversies. One of these resulted, through Calvin's orders, in the arrest and execution by burning of Michael Servetus, who was passing through the city. Servetus had committed no offense, except the writing of a book attacking the mystery of the Trinity.

While acting as dictator and administrator of Geneva, Calvin found time also to maintain a correspondence through all Europe, and was consulted upon points of law and theology by leaders everywhere. Up to 1561 the Lutherans and the Calvinists were as one, but in that year the latter expressly rejected important points of the Lutheran doctrine, and the two parties thereafter separated, and at times were embroiled in controversy and even war.

Calvin taught that every man is predestined to be saved or to be lost, that the saved are God's elect, and that man is regenerated

through the influence of God's spirit. Out of Calvinism rose the doctrine of infant damnation, and it has been associated generally with a severe and rigid conception of Christianity. Though the doctrines of the Presbyterian Churches are based on Calvinism, they have been greatly modified.

CALYCANTHUS, *kal i kan'thus,* a genus of hardy American shrubs, characterized by the aromatic fragrance of their bark, leaves and flowers. The bark is known as Carolina, or American, allspice. Four species grow wild in the region of the Alleghany Mountains.

CALYPSO, *ka lip'so,* in Greek mythology, a nymph who inhabited an island on the shores of which Ulysses was shipwrecked. She promised Ulysses immortality if he would remain with her, and succeeded in detaining him for seven years. At the end of that time, however, she was ordered by Mercury to permit Ulysses to depart, and she aided him in preparing the raft on which he made his escape. After his departure she died of grief. See ULYSSES.

CALYX, *ka'lix,* in a typical flower the outermost circle. Its purpose is to protect the more delicate parts within. The calyx is usually leaflike in structure, and its separate divisions are called sepals. See FLOWERS.

CAM, in machinery, a simple contrivance for converting a uniform rotary motion into a varied sliding motion. It is usually a projecting part of a wheel or other revolving piece, so placed as to give an alternating or varying motion to another piece that comes in contact with it, and is free to move only in a certain direction. Cams are used in printing presses, typesetting machines, internal combustion engines and many other devices.

CAMAGUEY, *kah'mah gway,* CUBA, formerly known as PUERTO PRINCIPE, is the capital of Camaguey province and the largest city in the interior of the country. It is twenty-five miles from its port, Neuvitas, on the north coast, and forty-five miles from the south coast. A railroad runs to its port, and the city is on the main Cuban railroad between Havana and Santiago de Cuba.

Camaguey has not been a progressive city, but within recent years has shaken off its lethargy and is becoming an important center. It has narrow, winding streets; its houses indicate age, and are built of brick and stone. There are three parks, or plazas. Cattle raising is the chief industry of that part of the island, sugar interests being second. Population, 1916, 79,166.

CAMBO'DIA, a French dependency in French Indo-China, lying to the east and north of the Gulf of Siam, and surrounded on the land sides by Siam, Annam and Cochin-China It has an area of 67,741 square miles, and is thus a little smaller than the state of Washington. The greater part of it is low and flat, with numerous streams, the chief being the Mekong. The soil is very fertile, producing large quantities of rice, sugar cane and maize, and the vegetation generally is marked by tropical luxuriance. Cattle are raised in large numbers. Among the wild animals are the elephant and tiger. Gold and precious stones are found. In early times Cambodia was a powerful state, exacting tribute even from Siam, but it gradually fell into decay, and early in the nineteenth century lost a large part of its dominions to Siam. Magnificent ruins attest the former prosperity of the country. Since 1863 it has been a protectorate of France, and since 1884 practically a French colony, though nominally ruled by a king of its own. The chief town is Pnom-Penh, on an arm of the Mekong. Population, estimated at 1,500,000.

CAMBON, *kahN boN'* JULES MARTIN (1843–), a French diplomat and legislator, to whose diplomacy is due a large measure of credit for the alliance between England and France. He served in the Franco-German War and afterward was given important official positions. He was made governor-general of Algeria in 1891, and after 1898 was French ambassador to Great Britain.

CAMBRAI, or **CAMBRAY,** *kahN bra'* FRANCE, a fortified city on the River Scheldt, in the department of Du Nord, 121 miles northeast of Paris. The place has long been celebrated for its manufactures of fine linens and lawns, called *cambrics.* During the World War the city figured in some of the most serious fighting of that struggle. In November, 1917, Sir Julian Byng, commander of the British Third Army, directed a surprise attack against the Hindenburg line before Cambrai and won a brilliant success, but German counterattacks subsequently offset much of the gains achieved. In the spring offensive of 1918 the Cambrai salient

was also a zone of strenuous fighting, and much of the city was destroyed. In 1911 it had a population of 26,600.

CAM'BRIAN PERIOD, the oldest division of geologic time that is distinguishable by well preserved remains of animal life. The name is derived from *Cambria,* the ancient name of Wales, where the rocks formed during this period were first studied. See CAMBRIAN SYSTEM; GEOLOGY.

CAMBRIAN, *kam'bri an,* **SYSTEM**, in geology, an extensive series of sandstones, conglomerates, slates and shales, lying under the Ordovician beds, and above the Archean, and divided into the Upper, Middle and Lower Cambrian. Many fossils occur in the series, including sponges, starfishes and other forms of shellfish. The Cambrian rocks are the oldest of the Paleozoic Era (which see).

CAMBRIC, *kame'brik,* a thin linen fabric used in making handkerchiefs, collars and cuffs, fine underwear and other articles of apparel. The word is said to be derived from *Cambrai,* the name of the town in France where the cloth was first woven, and which was particularly conspicuous in the World War. A cotton fabric with the fibers twisted very tightly is sold as an imitation of linen cambric.

CAMBRIDGE, *kaym'brij,* MASS., the sixth city in the state in size, and one of the county seats of Middlesex County, Lowell being the other. Cambridge is practically a part of Boston, lying just across the Charles River from the greater city. Its great distinction is that it is the home of America's first and one of its greatest universities, for it was here that Harvard College was founded in 1636. The Boston & Albany and the Boston & Maine railroads enter the city, but local traffic is provided by adequate street-car service with subway connection into the heart of Boston. Along the Charles River is a fine water front. The city is a manufacturing center as well as a center of education; the products are varied, but the printing trade is conspicuous, a number of great publishing firms having their establishments here. In addition to Harvard, Cambridge has the Massachusetts Institute of Technology, one of the most famous schools of its kind; Radcliffe College, for women, and Andover Theological Seminary, besides others of lesser note.

The city was founded as Newe Towne in 1630; in 1638 the present name was adopted, in honor of Cambridge, England. Longfellow's and Emerson's homes were here; the house of the former, now a memorial for him, is annually viewed by thousands of people. Population, 1910, 104,839; in 1917, 114,293 (Federal estimate). See HARVARD UNIVERSITY; BOSTON.

CAMBRIDGE, O., founded in 1806, is a city in Guernsey County, fifty-nine miles north of Marietta. The region is rich in coal and iron, petroleum, gas and pottery clay, and the industries center around these products. The Baltimore & Ohio and the Pennsylvania railroads serve the city, and it has repair shops of the first-named road. There is a Carnegie Library. The town was incorporated in 1837. Population, 1910, 11,327; in 1917, 13,804 (Federal estimate).

CAMBRIDGE, UNIVERSITY OF, one of the two great English universities, the other being Oxford. It is located at Cambridge, a town on the River Cam. The university comprises seventeen colleges, of which Saint Peter's College, founded in 1257, is the oldest, and Downing, founded in 1800, is the most recent. Each of these colleges is a separate corporation and is governed by laws and usages of its own, although subject to the paramount laws of the university.

The university governing body is composed of a chancellor, a vice-chancellor, the masters or heads of colleges, fellows of colleges and students. The senate, which is composed of all who have taken the degree of Doctor or Master, is the great legislative assembly of the university. The chief executive power is vested in the chancellor, the high steward and the vice-chancellor, who is the head of some college. Two proctors superintend the discipline of all pupils. Women who have fulfilled the conditions of residence and standing may be admitted to the examinations. Those who pass are placed in the published lists and receive certificates; but no degrees are conferred upon them. Two colleges, Girton and Newnham, have been established for women; but they are no part of the university, though many of the university lectures are open to students of these colleges. In normal years the undergraduate students number about 3,000.

CAMBYSES, *kam bi'seez* (?–522 B. C.), a son of Cyrus the Great. After the death of his father he became king of the Medes and Persians, 529 B. C. In the fifth year of his reign he invaded Egypt, conquering the

whole kingdom within six months, but his expeditions against the Ammonites and Ethiopians failed. His violent and vindictive nature broke out in cruel treatment of his subjects, his brother Smerdis and his own wife being among his victims. Cambyses died while on his journey home from Africa.

CAMDEN, Battles of, two battles of the American Revolution, the first fought August 16, 1780, between a force of 3,000 Americans under Gates and 2,000 British under Cornwallis. The latter was victorious, through strategic blunders on the part of Gates. The British loss was about 325 and the American fully 2,000 in killed, wounded and captured. Among the slain was General De Kalb.

BACTRIAN CAMEL ARABIAN CAMEL

The so-called second Battle of Camden, or the Battle of Hobkirk's Hill, was fought April 25, 1781, between an American force of 1,400, under Greene, and a British force of about 950, under Lord Rawdon. The British were the aggressors, leaving their position at Camden to attack the strong American works. Owing to a misunderstanding of orders the central brigade of the American force fled in confusion, and the whole army was forced to retreat with a loss of 271 against a British loss of 258.

CAMDEN, N. J., founded in 1631 and named for the Earl of Camden, is the county seat of Camden County, across the Delaware River from Philadelphia, a distance of one mile. The city is an industrial center of importance; here is located the Victor Talking Machine Company, employing 9,000 people; a great shipbuilding company, with 5,000 employes, and a nationally-famous soup-manufacturing company with 2,000 employes. The city is on the Pennsylvania, the Philadelphia & Reading and the West Jersey & Seashore railroads. Population, 1910, 94,538; in 1917, 108,117 (Federal estimate).

CAM'EL, indispensable as a beast of burden in arid countries, truly a "ship of the desert." It is a large cud-chewing animal, characterized by a long, arched neck, one or two humps on the back and a broad, fleshy pad on the sole of its foot, covering the toes. The native country of the camel is said to extend from Morocco to China, within a belt 900 or 1,000 miles in breadth. The common or Bactrian, camel, having two humps, is found in the northern part of this region exclusively, from Turkestan to China. The dromedary, single-hump, or Arabian camel, is found throughout the entire length of this zone, on its southern side, as far as Africa and India (see Dromedary).

To people residing in the vicinity of the great deserts, the camel furnishes an invaluable means of conveyance. It will travel three days under a load, and five days under a rider without drinking, and the stronger animals carry burdens weighing from 700 to 1,000 pounds. The camel's power of enduring thirst is partly due to the peculiar structure of its stomach, to which are attached little pouches or water cells, capable of straining off and storing up water for use when journeying across the desert. It can live on little food, and that of the coarsest kind, consisting of leaves of trees and nettles, shrubs and twigs. In this it is helped by the fact that its humps are mere accumulations of fat, which form a store upon which the system can draw when the food supply is short. Hence the camel driver who is about to start on a long journey takes care to see

that the humps of the animal present a full and healthy appearance. Camels which carry heavy burdens will go about twenty-five miles a day, those which are used for speed alone, from sixty to ninety miles.

The camel is a rather passive animal, with much less intelligence than the horse or elephant; but it is very vindictive when injured. It lives from forty to fifty years. Its flesh is esteemed by the Arab, and its milk is his common food. The hair of the camel serves in the East for making cloth for tents, carpets and wearing apparel and is imported into European countries for the manufacture of fine brushes for painting, and for other purposes. The alpaca and llama are the South American representatives of the family.

CAMELLIA, *ka mel'i a*, a genus of plants, with showy flowers and dark green, shining, laurel-like leaves, nearly allied to the plants which yield tea. The camellia of Japan and China is a lofty tree of beautiful proportions,

CAMELLIA

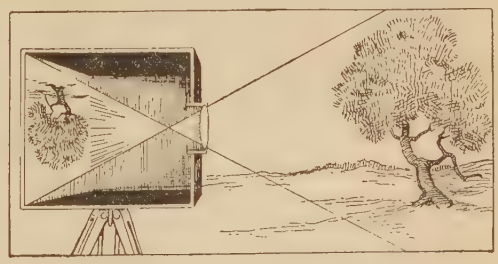
which is the origin of many double varieties of our gardens. Besides this species, one with small, white, scentless flowers, and another with large, peony-like flowers, are cultivated in America.

CAMEL'OPARD. See GIRAFFE.

CAMEO, *kam'e o*, the general name for all gems or stones cut in relief, that is, with raised figures, in contrast to intaglios, which are hollowed out. In a special sense a cameo is a gem composed of layers of different colors, the figures so engraved in relief that they appear in one color and the background in another. Onyx, sardonyx and agate are the stones generally used for cameos, while various kinds of shells and fine glass are used in the production of artificial cameos. The ancients were very skilful in this style of engraving, and there are still in existence many examples of wonderful workmanship, among which are some in the form of vases and dishes.

CAMERA, *kam'e ra*, an apparatus for securing pictures by photography. Inventive genius has so simplified the instrument that even the relatively indifferent person can manipulate it and secure good results.

Parts of a Camera. The word *camera* is from the Italian, and means *chamber*. The camera is not at all complicated in its construction, there being but four absolutely essential parts. These are the *box*, or *chamber*, securely closed against the admission of light where it is not desired; the *lens*, a circular piece of glass with curved faces to concentrate the light upon a plate, or film; the *shutter*, which works in the smallest fraction of a second to admit light; the *finder*, a smaller lens and mirror, by which the camera is focussed upon its object. The box, in the better class of cameras, is bellows-shaped, so

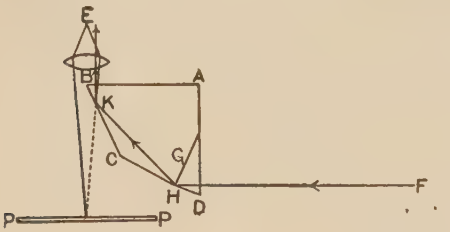


HOW A PICTURE IS PRODUCED
One side of the camera is opened, to show the direction of light.

that it may be lengthened or shortened to obtain proper focus upon the object to be photographed.

While not a part of the camera, the apparatus is useless without a sensitized plate or film, on which the picture is taken. If a plate, it is of glass, fitted into a holder, with a shutter to exclude light before being placed in the camera; the shutter is withdrawn after the plate and holder are in position. If a

film, it is of celluloid, wound on spools, and long enough to receive exposures for six or twelve pictures, the sections being turned successively into position before the lens by a small handle. Plates and films to fit all



sizes of cameras can be purchased wherever photographic supplies are for sale.

Cameras vary in size from those which produce pictures an inch square to large panoramic instruments which take a picture eight inches in depth and twenty inches or more in length. The camera in a photographic studio is mounted on a tripod fitted with small wheels by which it can be moved easily. Hand cameras may have tripod attachments for use in exposures requiring several seconds.

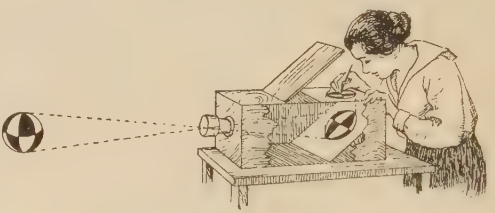
Uses of the Camera. The perfection of small, inexpensive cameras has made it possible for everybody to take pictures of vacation scenes and views of all kinds which appeal to the fancy, and this is the use of the instrument with which most people are familiar. They know, also, that the photographer uses it for portrait work. However, there are other uses to which a camera is put which are of surpassing importance. Special instruments are made to photograph the sun and the moon; so-called *multiplying cameras* can take several pictures of the same object at one time; *stereoscopic cameras* are double cameras for giving a double picture on the plate; *copying cameras* copy photographs from negatives; *cycloramic cameras* turn on pivots and take panoramic views.

The most wonderful cameras are those which by complicated mechanism take a long series of pictures of moving objects and give us the amusing or instructive views known as moving pictures. This phase of photography has become a great industry, and is described under the title Moving Pictures.

Related Articles. The processes of photography, explanation of plates, films, taking the picture, developing and printing, are explained in the article photography. See, also, Camera Obscura.

CAMERA LUCIDA, *loo'sid a,* an instrument used for sketching objects seen through a magnifying glass. It consists of a glass prism having four sides, represented by *ABCD*. The side *AD* and *AB* are perpendicular to each other, but *CD* and *BC* are so related that a horizontal ray of light striking *CD* at *H* is reflected to *K,* from which it is again reflected to E, where it passes through a double-convex lens. The eye placed above *E* sees the object on the paper at *PP*. The lens acts as a magnifying glass and enables the observer to sketch an enlarged image of the object as it appears on the paper. The camera lucida is in quite common use in laboratories for sketching minute parts of plants and animals.

CAMERA OBSCURA, *ob sku'ra,* an apparatus used for sketching landscapes, houses or other large objects. It is not longer used except by artists or by boys and girls as a



HOW THE CAMERA OBSCURA IS OPERATED

recreation; for practical purposes it has been superseded by photography. However, the principle of the camera obscura is important to understand, for upon it the camera (which see) is based.

It consists of a closed box painted black upon the inside and containing a mirror placed at an angle of 45°. Just above the mirror is a ground glass screen. The front of the camera contains a lens similar to that used in the photographic camera. When the image of the object is thrown upon the mirror, it is reflected to the screen, upon which it can be easily sketched. The camera should be used in a dark room.

CAMERON, Simon (1799–1889), an American statesman, born in Lancaster Co., Pa. He edited a newspaper in Harrisburg in 1822, supporting the candidacy of Andrew Jackson, and thus came to possess great influence in Democratic politics. He was elected to the United States Senate in 1845 and supported the Mexican War. In 1856 Cameron joined the new Republican party

and was again elected Senator. He was a formidable candidate for President in the convention of 1860, but was defeated by Lincoln, who, on becoming President, appointed Cameron as Secretary of War. He resigned under pressure in 1862, and was sent as minister to Russia. In 1866 he again became United States Senator, and he held that office until 1877, when he was succeeded by his son Don. Cameron was a strenuous opponent of civil-service reform and long was almost absolute master of Pennsylvania politics.

CAMILLE, *ka meel'*, the name of the English version of a play by Alexandre Dumas, the Younger, the French title of which is *La dame aux camélias*. Camille is also the name of the heroine of the play. The leading rôle affords excellent opportunities for powerful emotional acting, and the portrayal of the name part was one of the triumphs of Sarah Bernhardt, of Olga Nethersole and Helena Modjeska. A new version of the play was produced in New York in 1917 with Ethel Barrymore as Camille. Verdi's opera *La Traviata* is based on the story. The original French drama was first produced in 1852.

CAMOES, or **CAMOENS**, *ka mohNsh'*, LUIZ VAZ DE (1524–1579), the most celebrated poet of the Portuguese. He became a soldier and served in the fleet which the Portuguese sent against Morocco, losing his right eye in an engagement before Ceuta. Indignant at receiving no recognition of his services, he sailed for India in 1535, but being unfavorably impressed by the life led by the ruling Portuguese there, he wrote a satire which caused his banishment to Macao. Here he wrote the earlier cantos of his great poem, the Lusiad, an epic poem in ten cantos. Its subject is the voyage of Vasco da Gama to the East Indies, but many other events in the history of Portugal are also introduced. Returning to Goa in 1561, he was shipwrecked and lost all his property except his precious manuscript. After much misfortune, Camoes in 1570 arrived once more in his native land, poor and without influence, as he had left it. The *Lusiad* was printed at Lisbon.

CAM'OMILE. See CHAMOMILE.

CAMORRA, *ka mahr'rah*, a well-organized secret society, once spread throughout all parts of the kingdom of Naples. At one time the members known as Camorristas, were all-powerful, levying a kind of blackmail on all markets, fairs and public gatherings, claiming the right to settle disputes and hiring themselves out for any criminal service, from the passing of contraband goods to assassination. Though originally a secret society, the Camorra did not find it necessary under the régime of the Bourbons to conceal its operations, but under the present government of united Italy, the society received its deathblow through legal processes.

CAMOUFLAGE, *kam'oo flahzh*, a term derived from the French slang verb *se camoufler*, meaning *to disguise one's self*. The word came prominently into use during the World War, in connection with various practices in all armies to deceive the enemy. It is thus defined in *Uncle Sam's Fact Book of the World War* (1918):

> Camouflage is the art of protective and deceptive coloring and construction. In official English, the camoufleur "practices the art of military concealment," but a more literal translation of the French music-hall phrase, for that is what it is, proves him to be a "fakir." Camouflage is to the modern soldier what the handiest bush was to the American Indian. Fighting from cover first developed from that savage warfare and now has developed to a point where specialists in all manner of devices for concealing the whereabouts and designs of our troops from the eyes of the enemy are grouped together in military units.
>
> Wherever a machine is set up, or a trench is taken and reversed, or a battery of artillery goes into action, or a new road is opened, or a new bridge is built, or a sniper climbs an old building, or an officer creeps out into an advanced post to hear and to observe, there must go too the camouflage man to spread his best imitation of the magic veil of invisibility.

CAMP, WALTER (1859–), a prominent American authority on football and other athletic sports. He was one of the star members of the Yale football, baseball and boating teams previous to 1880, when he was graduated, and he was also prominent in general athletics. After his graduation he was chairman of the Yale athletic committee for a number of years, at the same time becoming generally known as a football expert. Camp is editor of *Spalding's Football Guide*, and every year football enthusiasts watch for his selections for the "All-America" team, made up of those whom he regards as star players. He is the author of a number of popular juvenile books, including *Jack Hall of Yale, Old Ryerson* and

the *Danny Fists* series. His athletic publications include *Book of College Sports, American Football* and *Football Facts and Figures.*

CAMPAGNA DI ROMA, *kam pah'nya de ro'mah,* the coast region of middle Italy, in which Rome is situated. It is from thirty to forty miles wide and 100 miles long, and forms the undulating, mostly uncultivated plain which extends from near Civita Vecchia to Terracina and includes the Pontine Marshes. The district is volcanic, and its lakes, Regillus, Albano and Nemi, are evidently craters of extinct volcanoes. In ancient times the Campagna, though never a salubrious district, was well cultivated and populated, the villas of the Roman aristocracy being numerous there. During the Middle Ages it was practically abandoned because of its unhealthful character, but within recent years the Italian government has reclaimed much of the region through drainage and other improvements.

CAMPANILE, *kahm pah ne'lah,* a name applied to a bell tower, constituting a separate building adjacent to a church to which it belongs. It is commonly used by the churches of Italy. The most famous examples are the campanile of the Cathedral at Florence, designed by Giotto in the fourteenth century; the Leaning Tower of Pisa (see PISA, LEANING TOWER OF); and Saint Mark's Campanile, 302 feet high, a landmark of Venice for over one thousand years, dating from A. D. 900. In 1902 it collapsed; work of restoration began in 1905, and the new Campanile was completed early in the year 1912.

CAMPANINI, *kahm pah nee'ne,* CLEOFONTE (1860–1919), an orchestra conductor and opera director. He was born in Italy, educated there as a violinist, and when but twenty-three years of age served as conductor at the opera house of Parma. At that time the Metropolitan Opera Company of New York secured his services as orchestra conductor, an engagement which opened the way to similar positions in Milan, Rome, Naples, Venice, London and several American cities. From 1910 to 1913 he served as director of the Chicago Grand Opera Company, and in 1913 succeeded Mr. Dippel as its general manager. Campanini ranked with the world's greatest conductors; he was especially notable because of his thorough knowledge of the music of all nations.

CAMPANULA, *kam pan'u la,* a genus of herbs with bell-shaped flowers, usually of a blue or white color. It includes several American species which are known to all lovers of wild flowers. The *harebell,* also known as the *bluebell* of Scotland, is found on damp rocks and rocky hillsides, and is an exceedingly pretty and delicate plant. The *Canterbury bell* is a European species, with large tubular flowers, formerly popular in gardens.

CAMPBELL, *kam'b'l,* ALEXANDER (1788–1866), an American theologian, founder of the Christian Church, or Disciples of Christ. He was born in Ballymena, Ireland, came to America in 1807, and was for a time in the ministry of the Presbyterian church. But accepting ardently the views of his father, Thomas Campbell, as set forth in the "Declaration and Address," calling for larger unity among divided churches, he began to agitate the question of larger union among Christian bodies upon the foundation of New Testament teaching without other creeds or formulations. This led presently to the organization of the body of people known as Disciples of Christ, or the Christian Church, known in some communities at one time as Campbellites. He founded Bethany College in West Virginia, of which he was president until his death. Campbell was the editor of the *Christian Baptist* and later of the *Millennial Harbinger.* See DISCIPLES OF CHRIST.

CAMPBELL, ALEXANDER, Sir (1822–1892), a Canadian statesman, born at Heydon, Yorkshire, England; educated at Lachine and St. Hyacinthe. He studied law and became a partner of Sir John A. Macdonald; in 1860 he was appointed dean of the faculty of law in Queen's University, Kingston. His first public office was that of alderman of Kingston (1851–2). Previous to Confederation he was speaker of the Legislative Council of Canada, but resigned in 1864 to become Commissioner of Crown Lands. He took a prominent part in both the Charlottetown and Quebec conferences. He became Postmaster-General in the first Dominion Cabinet and served for six years. He was called to the Senate in 1867 and for twenty years was the Conservative leader. Under Sir John A. Macdonald he held various Cabinet positions from 1878 to 1887, the most important being Minister of Justice. On June 1, 1887, he became Lieutenant-

Governor of Ontario; he died a few days before the expiration of his term, and was buried with public honors.

CAMPBELL, Colin, Sir, Lord Clyde (1792–1863), a famous British soldier, born in Glasgow. He was educated at the high school at Glasgow and afterward at the military academy at Gosport, and in 1808 he received an ensign's commission in the Ninth Regiment of Foot. He served in Spain under Sir John Moore and Wellington, had a part in the expedition to the United States in 1814, and from 1819 to 1825 was in the West Indies. In 1842 he was in China, and on the termination of the Chinese War he saw active service in India. On the outbreak of the Crimean War he became major-general, with the command of the Highland Brigade, and took a prominent part in repulsing the Russians at Balaklava. Campbell was appointed to the first command at the outbreak of the Indian mutiny, relieved Havelock and Outram at Lucknow, and crushed the rebellion entirely before the end of the year. He was created a peer, with the title of Baron Clyde, and had a large income allotted him. In 1862 he was made field marshal. He was buried in Westminster Abbey.

CAMPBELL, Thomas (1777–1844), an English poet, author of several lyrics dear to every patriot of England. His stirring *Ye Mariners of England* is an admirable example of verse having martial spirit and rhythm, as shown by the following four lines taken from the poem:

> Britannia needs no bulwarks,
> No towers along the steep;
> Her march is o'er the mountain waves,
> Her home is on the deep.

Campbell was born in Glasgow, and educated at the university in that city. After leaving the university, where he had won a reputation by his poetical translations from the Greek, he lived for a short time in Edinburgh. He rose suddenly to fame on the publication, in 1799, of his *Pleasures of Hope.* In 1803, he published an edition of the *Pleasures of Hope* with the addition of the lyrics *Hohenlinden, Ye Mariners of England* and *The Exile of Erin,* and in 1809 he published *Gertrude of Wyoming* and *The Battle of the Baltic.* In 1820 he became editor of the *New Monthly Magazine,* a position which he held for ten years. Campbell took an active part in the foundation of London University, and in 1827 he was elected rector of Glasgow University. He died at Boulogne and was interred in the Poets' Corner, Westminster Abbey.

One of his popular ballads, Lord Ullin's Daughter, will be found in the article Language and Grammar.

CAMPBELL-BANNERMAN, Sir Henry (1836–1908), a British statesman, Premier of England from 1905 to 1908. He was a Campbell, and the additional name of Bannerman was added under the terms of the will of a maternal uncle. He entered Parliament as a member for Stirling district, Scotland, in 1868, and represented that district until his death. Throughout Gladstone's career, Campbell-Bannerman was loyal to him and served as Secretary for War in Gladstone's administrations of 1886 and 1892. In 1899 he became the Liberal leader of the House of Commons, and in 1905 he succeeded Balfour as Premier. In 1908 he resigned because of ill health. Sir Henry was distinguished for moderation, good sense and clear vision rather than for brilliance of intellect, but he helped to unite the Liberal party and to lay the foundations for the work of his successor, Herbert Asquith.

CAMPEACHY, or **CAMPECHE,** *kahm-pay'chay,* Mexico, a seaport on the west coast of the peninsula of Yucatan, at the mouth of the San Francisco River. Campeachy is the capital of a state of the same name. Shipbuilding and the manufacture of cigars are the chief industries. A considerable trade in campeachy wood and wax is maintained, but the harbor is shallow and can be entered only by vessels of light draught. Population, 17,000.

CAMP-FIRE GIRLS, an organization for the physical, mental and spiritual development of girls from ten to twenty years of age. It is very similar in purpose and methods to the Boy Scouts (which see), and was organized in 1911 by Luther H. Gulick and his wife. The organizers of this practical society planned to make it a medium for teaching girls the beauty and sanctity of homemaking, and the necessity of developing the body and soul harmoniously. The symbol of the organization is fire, which stands for home, service and romance; the watchwords are Work, Health, Love. Three degrees of membership may be attained—Wood Gatherer, Fire Maker and Torch Bearer. The sole requirement for becoming a Wood Gatherer

is ability to repeat the prime law of the Camp-Fire Girls;

Seek beauty	Hold on to health
Give service	Glorify work
Pursue knowledge	Be happy
Be trustworthy	

Those who attain the degree of Fire Maker learn a chant known as the *Fire Maker's Song:*

As fuel is brought to the fire,
So I purpose to bring
My strength,
My ambition,
My heart's desire,
My joy
And my sorrow
To the fire
Of humankind.
For I will tend
As my fathers have tended,
And my father's fathers
Since time began,
The fire that is called
The love of man for man,
The love of man for God.

Ability to carry out the following lines of activity is also essential:

To help prepare and serve, together with the other candidates, at least two meals for meetings of the Camp-Fire.

To mend a pair of stockings, a knitted undergarment and hem an article having a hem at least one yard in length.

To keep a written, classified account of all money received and spent for at least one month.

To tie a square knot five times in succession correctly and without hesitation.

To sleep with open window or out-of-doors for at least one month.

To take an average of at least half an hour daily outdoor exercise for not less than a month.

To refrain from soda water, chewing gum and candy between meals for at least one month.

To name the chief causes of infant mortality in summer. Tell how and to what extent it has been reduced in one American community.

To know what to do in the following emergencies: clothing on fire; person in deep water who cannot swim; open cut; frosted foot; fainting.

To know the principles of elementary bandaging and how to use surgeon's plaster.

To know what a girl of her age needs to know about herself.

To commit to memory any good poem or song not less than twenty-five lines in length. Know the words of America.

To know the career of some woman who has done much for her country or state.

The successful aspirant for the highest degree must win certain honors.

Every Camp-Fire organization has a head officer known as the Guardian, who serves by virtue of a license obtained from the New York City headquarters. Local organizations may be formed at any time, and complete information for the necessary steps may be obtained from the headquarters in New York.

CAMPHOR, *kam'fur,* a whitish translucent gum with a bitterish, aromatic taste and a strong stinging odor. It is derived from the bark and wood of a tree belonging to the laurel family, found in various parts of the Far East. Camphor is used in great quantities in the manufacture of pyroxylin, a valuable explosive, and for several years past the Japanese island of Formosa has supplied practically all of the world's requirements. The industry in Formosa has long been operated under a government monopoly, and the forests have been depleted to such an extent

BRANCH OF CAMPHOR TREE

that the government is giving serious attention to forestry and conservation methods. To bring about an improvement in the world's supply the development of the camphor tree in Florida has been undertaken, and there are now several thousand acres under cultivation in that state.

The extraction of camphor gum is accomplished by steam distillation. The product is drained, volatile oil is removed by pressure, and the resulting mass is then purified. What is known as *spirits of camphor* is a mixture of camphor, alcohol and water. The common uses of the gum and the liquid are well known. Spirits of camphor has antiseptic qualities, and when taken internally it acts as a stimulant. It is used to alleviate hysteria and inflammation of the large intestine, and in the treatment of cholera. Taken in too large doses, it acts as a poison. Camphor gum, besides being utilized in the making of explosives, is employed in the manufacture of celluloid. It is also an ingredient of a variety of moth balls.

CAMPO SANTO, *kahm'po shan'to,* (holy field), the Italian name for a burying ground, used especially to designate the more remarkable of these places, those which are surrounded with arcades and are richly adorned. The most famous Campo Santo is that of Pisa, which dates from the twelfth century, and has on its walls frescoes of the fourteenth century of great interest in the history of art.

CAMPS AND CAMPING. There comes a time in the life of every boy when he wants to go camping. This is a natural desire which should be encouraged and led into proper channels rather than suppressed by the objections of parents. The wish to go camping may be due to a variety of reasons, but it is inevitably a healthful desire. Nobody but the veriest "tenderfoot" now thinks of camping as necessitating hardships; the camper, young or old, can be just as comfortable as he is at home. Not only has he comfort, but he has the freedom of all out-of-doors.

Equipment and Clothing. In an article of limited scope it is possible to give only a few suggestions which may prove valuable to all campers. Each party must determine for itself what camp and personal equipment shall be taken. The question of food is also a matter which must be determined according to the likes and dislikes of the individual members. Each member of the party, if possible, should have his waterproof canvas bag for clothing—the less clothing the better. Four pairs of woolen socks, two gray flannel shirts, two sets of woolen underwear, a suit of woolen pajamas, a pair of trousers and a woolen sweater will be all the extra clothing needed for camping in the woods in the fall or early spring. Woolen garments are better than cotton, because they dry more rapidly if wet, and generally keep the body at a more even temperature. The best sort of a hat is an old soft felt one, with a moderate brim which will shed the rain.

For summer outings some light clothing will be necessary, but even in the hottest months woolen clothing and a sweater should be on hand. Just what additional things to take one will know only after he has camped out several seasons. Take an extra pair of shoes and a pair of moccasins if possible, some thread, needles, buttons, a pair of scissors, a toothbrush, a pocket comb in a case, several towels, a small mirror, a note book with a place for a pencil in the back. Do not take ink. A compass and a waterproof match safe will be useful, especially in the woods. Keep this match safe only for emergencies and never leave camp without it. In any camp there must be several good jackknives, a saw, axe, nails and twine. The average boy will find that a magnifying glass and a field glass will add to his enjoyment, for both will enable him to get in closer touch with nature.

Choosing a Site. Strange as it may seem, not many people are able to select a good camping ground. Few people think that a camp really is a camp unless they can see water from the tent. There is always the temptation to make camp on the edge of a lake or stream. This should never be done, as the low ground is damp and generally infested by mosquitoes. If there is no high land near the shore make your camp on some point projecting out into the water, where the currents of air keep most of the mosquitoes away. It is more important to have the camp near a good supply of wood, as it is easier to carry necessary water than the firewood. If you can find the right sort of a place make your camp on ground sloping to the south; this will give the sun a chance to shine into your tent. Never build a camp in dense woods, on account of falling timber, or where water will settle after a rain, or near dead wood or underbrush, which is always a breeding place for mosquitoes and other insects.

Camp Fires. After locating your camp the first thing to do is to get a fire started—easy enough when there is plenty of dry wood, but difficult when there has been a long rain and everything is soaked with

water. In rainy weather, if you cannot find dry wood, hunt for a cedar, as it splits and ignites easily. After you have chopped it into firewood, take some of the smaller pieces and stack them in a pyramid to make a draught. Then from the dry heart of the tree whittle enough shavings to start the fire. If you cannot find a cedar you can generally get some dry birch bark on the lee side of a tree and some dead twigs which will give enough of a blaze to dry firewood. There

THREE WAYS OF BUILDING A CAMP FIRE

may be no birch or cedar; then the only thing is to chop into a fallen tree for dry wood and whittle shavings. If it is still raining, build the fire on the lee side of some tree or boulder. Never underestimate the amount of firewood required for the night; it is better to have too much than to hunt around for more before daybreak. In the winter time never make camp fire under a tree covered with snow, as the heat will melt the snow and the water may put the fire out.

There are various ways of building a night fire; only one of the simplest will be described here. First cut two green stakes and drive them slantingly into the ground. At right angles to a line between the stakes lay on the ground two large, green logs for fire-dogs, and on these pile small stuff and dry wood. Pile five-foot logs against the stakes and then drive two more stakes to hold them in position. As the bottom log against the stake burns away the one above it will drop in its place and you will have a fire which will burn evenly all night.

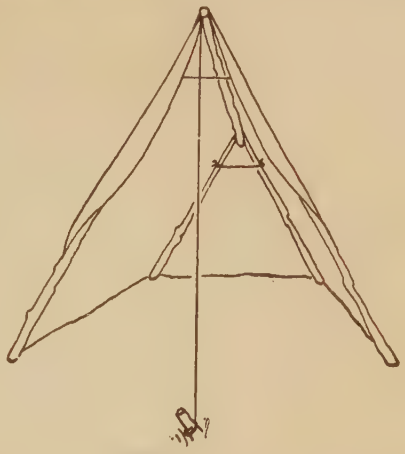
One glance at the fire will tell what kind of a camper built it. The log fire just described will throw its heat forward into a tent or lean-to, and will last for hours, but it is useless for cooking. As a general rule, hardwoods make good, slow-burning fuel that yields lasting coals, and softwoods make a quick, hot fire that is soon spent. The following woods will burn scarcely at all when they are green: Aspen, black ash, balsam, boxelder, pitch pine, sycamore, tamarack and poplar, chestnut, red oak and red maple burn very slowly when green. All of the soft pines crackle and are likely to pop; certain hardwoods such as sugar maple, beech and white oak, must be watched for a time after the fire is started, because the embers they shoot out are long-lived and hence more dangerous than those of softwoods. The best of all firewoods is hickory, green or dry; it makes a hot fire, lasts a long time, and burns down to a bed of hard coals that keep an even heat for hours.

For cooking and baking, a bed of hot coals is generally better than live flame; only the novice piles on more wood when he begins to cook. There are a great many ways of building the fire for cooking and as many ways of arranging and supporting the utensils. If a high wind is blowing and the camp is in an unprotected spot, it may be wise to dig a fire hole, so that the hot coals will not be blown away. The simplest way, however, is to level off the tops of two green logs, and after laying them eight inches apart at one end and four at the other, to build a fire between them. Another method is to hang the coffee-pot or tea pail from a crane made by driving a crotched stick into the ground and resting a long green pole in the crotch, one end being held down by a stone or a log, the other end being over the fire. The common way, however, is to set two crotched sticks in the ground one on each side of the fire, and put a cross piece from one to the other; from this cross piece hang forked sticks, with nails driven into them at various heights to hold the pails. Frying may be done over two logs rolled

into the fire. In a permanent camp three pieces of lead pipe, wired together, are often used as a rack.

Shelter. The most quickly constructed shelter is made by leaning three seven-foot poles against a fallen tree, and then spreading your tarpaulin or rubber blankets over the poles. Be sure the tree is flat on the ground or there will be a draught under it. The most popular brush camp is the lean-to, the only practical brush camp to have when there are more than three persons in the party. First drive two crotched sticks into the ground about eight feet apart, and on these put a stout sapling. Against this lean poles, about a foot apart, making them secure at the bottom by sticking them into the ground or by rolling a log against them. On this framework, and up and down the sides lay hemlock or spruce boughs, which should be lapped like shingles so that they will shed the rain.

These brush shelters are good enough for a temporary camp, but if you are to camp for a considerable length of time a tent will be a great convenience. The kind of tent you buy will depend on the number of people who use it and the price you are willing to pay. A good tent is a luxury, but a poor tent is an abomination; buy the best one your purse can afford. A tent should be easy to set up. It should shed heavy rains, and should stand securely in a strong wind. It should keep out insects and cold drafts, but let in the rays of the camp fire and plenty of pure air. It should be cool and airy on summer days, but warm and dry at night. Probably no single tent has ever been devised which will fulfill all these conditions at the same time; certain kinds of tents are better for one purpose than another. For a fixed camp, a wall tent is generally perferred, because it is easy to set up and has plenty of head-room. For extreme lightness and ease of pitching the A-tent is recommended. In this case poles are not absolutely necessary; a strong tape may be



SIMPLE "A" TENT

sewed along the ridge of the tent, ending in a loop at each end, from which a light rope is stretched between two trees, the ropes being made taut by two poles bracing it at each end and outside of the tent. In setting up an A-tent most campers use center poles at the front and back to support the ridgepoles; the accompanying sketch shows a simple method of setting up a tent without using the center poles. First cut a ridgepole and four diagonal supports of the proper length. Tie two of the supports with marline two feet from the ends to hold up the front end of the ridgepole, and tie the other two poles in the same way for the back end. Through the top of the tent run a rope about two and a half times as long as the tent; then lift up the ridgepole and the tent and support it by the diagonal braces. Tie the long rope to short stakes driven into the ground about ten feet from the front and back of the tent, then spread the braces till the tent just touches the ground and is ready to be pegged down. When the tent sags, as it always will during

THREE STYLES OF TENTS

a rain, you have only to pull in the poles at the bottom in order to make everything taut again.

After the tent is up the first thing to do is to level off the ground. You should decide how you will lay your bed and level the ground so that your feet will be lower than your head. The details of furnishing a tent can be merely mentioned here; racks and hooks for pots, guns, tools, clothes and game will be needed. If you have a floor cloth, spread it out; if not, cover the ground with balsam or cedar twigs and shoots. If your tent has an awning in front, that is just the place for a dining table. Inexperienced campers generally omit one other detail which is necessary to comfort. If the ground, as it should, slopes from the back of the tent to the front, dig small trenches at the back and sides, about six inches or a foot outside the tent. In severe rainstorms no other devices will keep the inside of the tent dry and comfortable. A little experience in adapting himself to whatever conditions he has to face will enable the camper to improve his outfit from year to year. Lack of experience should never deter any one from camping.

CAMPUS MARTIUS, *kam'pus mar'shus*, a large open space in the suburbs of ancient Rome, consisting of the level ground between the Quirinal, Capitoline and Pincian hills and the River Tiber. This space was set apart for military exercises and was sacred to the god Mars, whence the name. In the latter period of the republic it was a suburban pleasure ground for the Romans, and it was laid out with gardens, shady walks, baths and theaters. The site is now occupied by a thickly-settled portion of the modern business city.

CANAAN, *ka'nan*. See PALESTINE.

CA'NAANITES, in general, the name given to the heathen nations found dwelling in Palestine west of the Jordan. At the time of the Israelitish invasion these different nations were the Hittites, Jebusites, Hivites and Amorites. It is not to be inferred from the collective name applied to them that all these peoples were the descendants of Ham, who, according to Bible genealogy, was the father of the Canaanites. On the contrary, their origin can be traced to a number of different sources.

The Canaanites were gradually subdued by the Israelites, but in Solomon's time all paid tribute. In language, government, morals and religion these people were different from the Israelites, the principal feature of their religion being the worship of Baal and Asherah, his consort, who was called "the happy." The symbol of Asherah was the stem of the tree, though this was sometimes carved into an image. The symbol of Baal was probably a cone, and represented the rays of the sun. It was undoubtedly the mingling of these symbols in large numbers which constituted the groves of Baal, so frequently mentioned in the historic books of the Old Testament.

Coat of Arms and Maple Leaf

CANADA, DOMINION OF, the largest and most important overseas possession of the British Empire, stretching across the North American continent from ocean to ocean north of the United States, excepting in the northwest corner, where is situated the United States territory of Alaska. To the north are the icy waters of the Arctic Ocean. Its greatest width from east to west is 2,700 miles; its length from north to south is about 1,600 miles. Parts of the southern portion are as densely populated as many of the states of the American Union. Above the 60th degree of latitude there are few people; beyond the 65th parallel only hunters and trappers usually are found.

The area of Canada is 3,729,665 square miles—over 700,000 square miles larger than continental United States. Only by including all outlying possessions of the latter, is the territor of the United States equal to that of Canada. Canada's population in 1911 was 7,206,643; because of the vast northern wastes this is an average of only about two people to the square mile. The density of population is shown in the table on page 661.

A Study in Areas. Canada is nearly as large as the continent of Europe. The foreigner is inclined to take the view that it is only a small part of North America. Few realize that many of the provinces are empires in themselves; that British Columbia is almost three times as large as Great Britain and Ireland, nearly twice as large as France,

PACIFIC OCEAN
BEAUFORT SEA
BRITISH COLUMBIA
YUKON
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
NORTH DAKOTA
SOUTH DAKOTA
MONTANA
IDAHO
OREGON
WASHINGTON
CALIFORNIA
NEVADA
WYOMING
UTAH
COLORADO
Longitude 105 West
from 100 Greenwich

DOMINION OF CANADA
AND NEWFOUNDLAND
ENGLISH STATUTE MILES
100 200 300 400 500
Hammond's New map of Dominion of Canada
Copyright by C.S.Hammond & Co.,N.Y.
BAFFIN BAY
BAFFIN LAND
GREENLAND
(to Denmark)
DAVIS STRAIT
HUDSON STRAIT
HUDSON BAY
JAMES BAY
FOX Chan.
ATLANTIC OCEAN
DENMARK STR.
ICELAND
NEWFOUNDLAND
LABRADOR
QUEBEC
ONTARIO
NOVA SCOTIA
NEW BRUNSWICK
PRINCE EDWARD ISLAND
MAINE
NEW YORK
MICHIGAN
WISCONSIN
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Montreal
OTTAWA
TORONTO
HALIFAX
St. John
Quebec
Boston
Chicago
Detroit
Milwaukee
Cumberland Sd.
Frobisher Bay
Hudson Str.
Davis Str.
Labrador Current
Gulf of St. Lawrence
Bay of Fundy
Strait of Belle Isle
Hamilton Inlet
Grand Falls
Height of Land
St. Lawrence R.
Ottawa R.
Hudson Bay
James Bay
Fox Chan.
Foxe Basin
Baffin Land
Greenland
Atlantic Ocean
Labrador
Newfoundland
Quebec
Ontario
Nova Scotia
New Brunswick
Prince Edward Island
Maine
New York
Michigan
Wisconsin
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Montreal
Ottawa
Toronto
Halifax
St. John
Quebec
Boston
Chicago
Detroit
Milwaukee

and as large as Chile, which is over 2,700 miles in length; or that Saskatchewan is as large as Austria-Hungary. The accompanying map, showing general comparisons, graphically suggests the greatness of the Dominion and its possibilities for development.

PROVINCES	POPULATION 1911	DENSITY OF POPULATION PER SQ. MI.	MALE	FEMALE
Alberta*	374,663	1.46	223,989	150,674
British Columbia	392,480	1.10	251,619	140,861
Manitoba*	455,614	6.18	250,056	205,558
New Brunswick	351,889	12.61	179,867	172,022
Nova Scotia	492,338	22.98	251,019	241,319
Ontario	2,523,274	9.67	1,299,290	1,223,984
Prince Edward Island	93,728	42.91	47,069	46,659
Quebec	2,003,232	5.69	1,011,502	991,730
Saskatchewan*	492,432	1.95	291,730	200,702
Yukon	8,512	0.04	6,508	2,004
North West Territories	18,481	0.01	9,346	9,135
Totals	7,206,643	1.93	3,821,995	3,384,648

*Provincial censuses in 1916 gave Alberta 496,525 people; Manitoba, 553,860; Saskatchewan, 647,835.

The People. Canada, like the United States, is a "melting pot of the nations." The census of 1911 lists as residents of the Dominion people of twenty-two nationalities, each represented by at least 2,500 persons, and 185,000 persons of various other nationalities whose representation is smaller.

English is the native tongue of 3,900,000 English, Irish and Scotch citizens, but French is the language of more than 2,000,000 people. The French were Canada's first settlers, and there are hundreds of communities in Quebec that are yet entirely French in language and customs, and are likely long to remain so. Nova Scotia was settled largely by the Scotch; in New Brunswick, Ontario and some parts of lower Quebec the early settlers were loyalists who left the English colonies at the south when the Revolutionary War drove them to a decision between loyalty to Britain and espousal of the cause of the American colonists.

GRAPHIC ILLUSTRATION OF AREAS OF CANADA AND OTHER POLITICAL DIVISIONS

Large numbers of citizens of the United States during the present century have emigrated to Canada, particularly to the "prairie provinces." From July, 1900, to

March, 1917, the number from the United States who sought new homes in Canada totaled 1,156,764. The American exodus to Canada is over 61,000 per year at the present time.

Religions of the People. It is natural that many citizens of the Dominion should adhere to the English Church. In point of numbers the Roman Catholics outnumber any other sect. The important sects and numbers of adherents appear in the following table, taken from most recent Dominion census:

Roman Catholics	2,833,041
Presbyterians	1,115,324
Methodists	1,079,892
Anglicans	1,043,017
Baptists	382,666
Lutherans	229,864
Greek Church	88,507
Jews	74,564
Mennonites	44,611
Congregationalists	34,054
Doukhobors	10,493

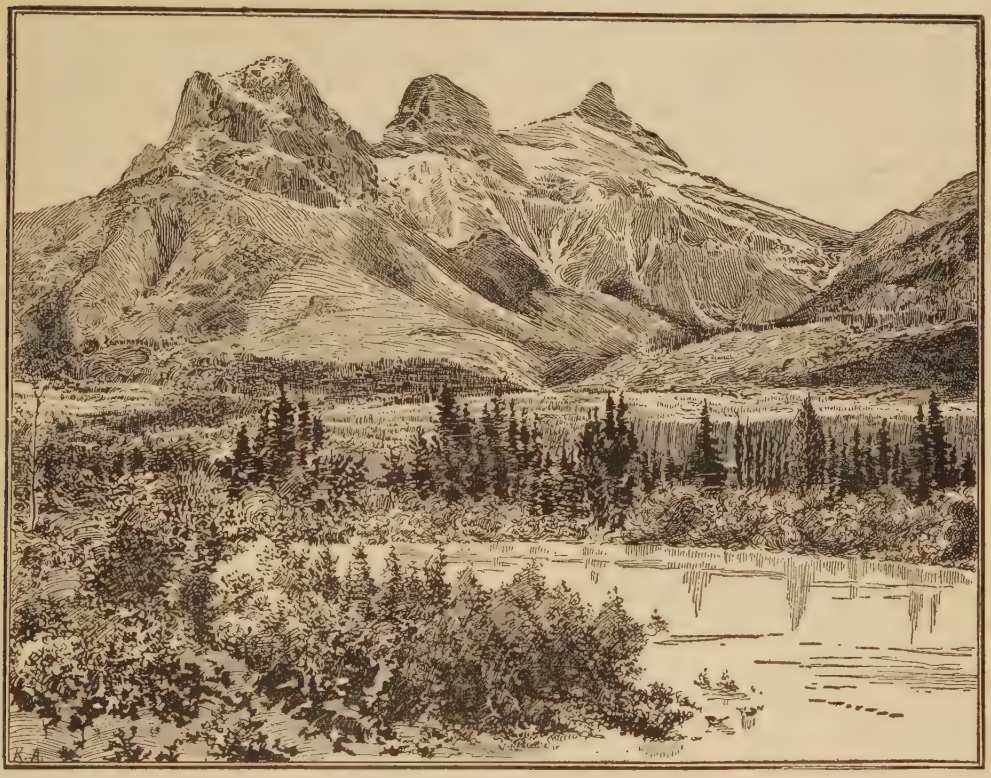
Surface and Drainage. In respect to surface, Canada can be divided into three great regions; the eastern highlands, the central plain and the western, or Rocky Mountain, highlands. The eastern highland region extends from the Atlantic coast westward to the southern extremity of Hudson Bay. It is characterized by ranges of low mountains and hills and approximately level plains. The highest land in the east is found on the coast of Labrador, where some of the peaks reach up to 8,000 feet. The Laurentian Mountains, north of the Saint Lawrence River and nearly parallel with it, in some places attain a height of about 4,000 feet. Detached summits or buttes from this range are found westward as far as Montreal, the mountain of Montreal being one of these peaks, and to the south of the river and a little east of this several others rise.

Extending westward from the eastern highland region is the great central plain of Canada, which is a continuation northward of the plain in the United States. Along the international boundary this is about 700 miles wide and terminates in the foothills of the Rocky Mountains, which form a part of the boundary between Alberta and British Columbia. Extending northward, this plain includes the northeastern corner of British Columbia, and then its western boundary follows the Rocky Mountains between Mackenzie and Yukon. The Rocky Mountain highlands begin with the foothills of the Rocky Mountains in Alberta and extend westward to the coast. This region embraces the provinces of British Columbia and Yukon Territory; the southern part of it is broken by numerous ranges of the Rockies and coast ranges.

About 250 miles north of the Saint Lawrence River and running parallel with it as far as Ontario, is a low ridge, known as the Height of Land, separating the waters of the Saint Lawrence basin from those flowing into the eastern side of Hudson Bay. After entering Ontario this height of land continues westward north of the Great Lakes until it reaches a point a little west of Lake Nipigon, when it bends southward and extends diagonally across Minnesota to the headwaters of the Red River of the North. From here it bends to the northwest, and after traversing Dakota in an irregular line, reënters the Dominion at the northwestern corner of this state. It then extends westward near the international boundary until it reaches the Rocky Mountains. Another similar divide starts in Alberta a little north of Edmonton and extends northeasterly through that province and across Saskatchewan nearly to the eastern boundary, when it bends to the north and northwest and extends through Mackenzie to Lake Aylmer, thence northeasterly to Melville Peninsula. This divide separates the waters flowing into Hudson Bay on the west from those finding an outlet in the Arctic Ocean through the Backs, Coppermine and Mackenzie rivers.

The Saint Lawrence, with its tributaries, is the largest and most important river system. Its basin includes the Great Lakes, nearly one-half of which belong to Canada. From the north the important tributaries are the Saguenay, the Saint Maurice and the Ottawa, while the most important tributaries from the south are the Richelieu and the Saint Francis. The northern part, or the region between James Bay and the Atlantic Ocean, is low and contains a number of lakes. All of the central plain south and east of the watershed crossing Alberta is drained into Hudson Bay. The important rivers are the Saskatchewan and its outlet, the Nelson, and the Churchill. The most important lake in this region is Lake Winnipeg. To the north and west of the watershed are the Athabasca, Mackenzie, Coppermine and Backs rivers, which furnish drainage for the northern part of Alberta, Saskatchewan and

nearly all of the great areas of North West Territories. In the northern part of this region are numerous large lakes, the most noted being Athabasca, Great Slave Lake and Great Bear Lake. West of the main range of the Rocky Mountains the principal rivers are the Columbia, the Fraser, the Skeena and the Stikine. The greatest body of water in Canada is Hudson Bay, a veritable inland sea covering over 400,000 square miles and more than four times as large as all the Great Lakes.



THE THREE SISTERS, CANMORE

The physical features of the various provinces are more minutely described in articles relating to them, in their alphabetical places in these volumes.

Climate. In latitude Canada extends from near the 40th parallel to the North Pole, and its great extent from north to south, as well as the varied local conditions between the Atlantic and Pacific coasts, gives the Dominion a great variety of climate. The cold currents in the Atlantic which flow along the coasts of Labrador and Newfoundland impart to this region a cold, damp climate; hence the provinces of Nova Scotia, New Brunswick and Quebec have severe winters, frequently accompanied by great depths of snow, and short, hot summers. While the rainfall in this region is not heavy, it is everywhere sufficient for agriculture. The southern portion of Ontario on account of its proximity to the lakes, has a much more equable climate, but in the northern portion and in the heart of the continent, occupied mostly by Manitoba and Saskatchewan, the extremes of an interior continental climate are manifest.

In Manitoba the summers are hot, while during winter the thermometer often descends to 50° below zero. However, the dry atmosphere of this region mitigates the severity of the cold. At Medicine Hat, "where the weather comes from," the winter temperature is often milder than in Illinois. To the westward and along the eastern slope of the Rocky Mountains, the climate is much more salubrious, owing to the Chinook winds, which modify the severity of the winter (see CHINOOK), while to the west of the principal mountain range British Columbia, owing to

the influence of the warm winds from the Pacific, has a comparatively mild climate throughout the year. The Yukon and the North West Territories have an arctic and sub-arctic climate. With the exception of a few areas in the center of the great plain, all portions of the Dominion have ample rainfall.

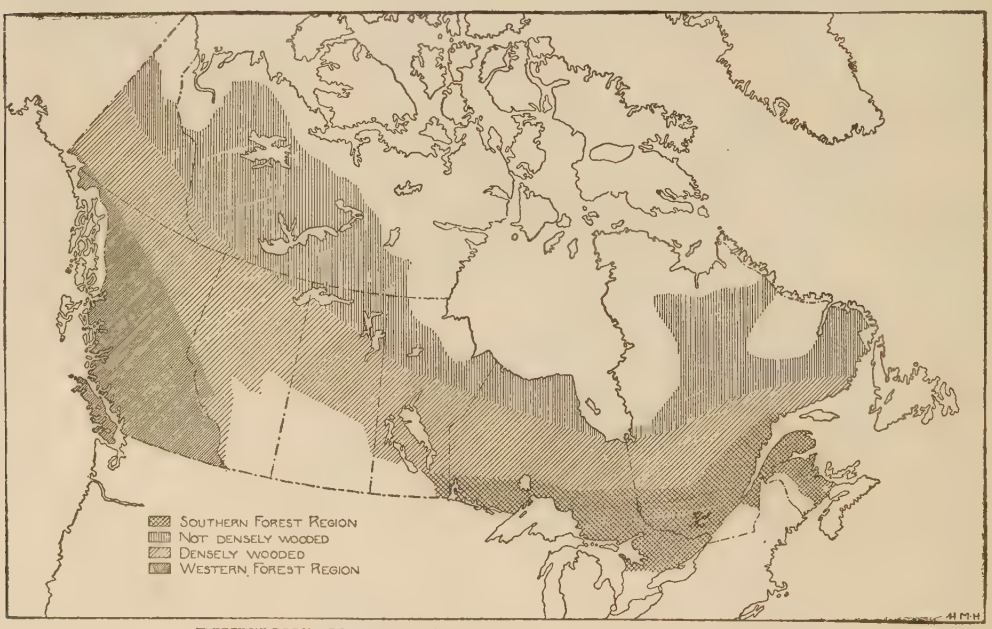
For vegetation and animals, see North America, subheads Vegetation and Animal Life.

Mineral Resources. Canada is abundantly supplied with valuable minerals. In 1895 the annual production of minerals was worth only $20,500,000, but by 1917 had increased to over $177,000,000 per year. Iron of excellent quality is found in abundance in Quebec, Ontario and British Columbia. The district around Lake Superior and Lake Huron has valuable deposits of copper and some silver.

Nova Scotia contains some of the richest coal fields in North America, and on Vancouver Island in British Columbia are valuable mines of bituminous coal, while in Alberta and Saskatchewan are found large areas of good quality. The area of the entire coal measures of Canada is estimated at about 100,000 square miles.

Gold has been found in nearly all provinces, but it occurs in paying quantities only in Ontario, the Yukon and British Columbia. The gold mines at Porcupine, near Lake Superior, have made the vicinity one of the world's greatest gold fields (see PORCUPINE). In Ontario, at Copper Cliff, is the largest nickel plant in the world; the mines produce more than half of the world's output of this metal. Petroleum and salt are also found in the peninsula between Lakes Erie and Ontario, and there are valuable quarries of asbestos and building stone, the latter being widely distributed through the Dominion. The principal source of asbestos is Quebec.

Agriculture. The extreme northern part of the Dominion is too cold to admit of cultivating the soil, but the soil and climate of the southern provinces, and of nearly all of the vast interior and of the valleys in British Columbia, are well adapted to tillage. Agriculture is the leading industry of Canada, and seven-tenths of the people are engaged in some sort of agricultural occupation. There is invested in agriculture in the Dominion over $5,000,000,000. Of this great total about one-fourth is in Ontario, but before many years the balance will swing to the "prairie provinces." Each province is especially adapted by soil and climatic conditions to certain lines of agriculture, and in every case those occupations which are best adapted to each locality constitute its chief industries. The great interior is being



DIVISIONS OF THE WOODED AREAS OF CANADA

rapidly developed, and it constitutes one of the greatest wheat regions in the world. In general, the important crops are wheat, potatoes, oats, barley, peas, beans, beets and flax. Cattle, horses and sheep are raised in large numbers, and dairying has become a very important industry, Canada ranking as the first country in the world as an exporter of cheese.

For detailed description of Canadian agriculture, see articles under the different provinces.

Lumbering. Canada has a more extensive forest area than any other lumber-producing country in the world. The lumber industry may be divided into three great sections:

(1) The southern forests, including most of southern Ontario, the St. Lawrence Valley and the maritime provinces. The principal trees of this region are maple, beech, ash, birch, pine, spruce and cedar.

(2) The northern forests, which reach across the continent from the Gulf of St. Lawrence to the Rocky Mountains. The southern strip as shown on the chart is densely wooded, spruce, pine, tamarack and poplar being the most valuable trees. North of this strip is another, known as the not densely wooded, including such hardy varieties as spruce, larch and canoe-birch.

(3) The western or Cordilleran forests, which extend from the Rocky Mountains to the Pacific Ocean. The common trees in this region are Douglas fir, cedar, black pine and white spruce.

Lumber Cut. For many years white pine was the most important source of the timber supply, but spruce since 1908 is far in the lead. With the growth in lumbering in British Columbia, the Douglas fir is gradually increasing in value. The total cut of timber in the Dominion each year is over 3,500,000,000 feet, board measure, worth nearly $60,000,000. Besides, the lath and shingle output amounts to nearly $8,000,000 per year.

For the development of forestry and the forest reserves, see Forests and Forest Reserves in Canada.

Fisheries. Canada possesses the most extensive fisheries in the world, and the Dominion also can boast that its waters contain the principal food fishes in greater abundance than they are found elsewhere. Along the Atlantic Ocean are 5,000 miles of shore line; along the Pacific, 7,000 miles. The Atlantic deep-sea fishing is conducted from twenty to ninety miles off shore; sailboats have very generally disappeared and power boats, fleeter and easier to handle, have appeared within the last few years to the number of over 13,000 on both sides of the continent. The Atlantic catch consists largely of cod, haddock, hake, and halibut. Inshore fishing nets cod, haddock, hake, halibut, herring, mackerel, shad, flounder and sardine.

The Pacific fisheries are famous for the vast salmon catch (see SALMON), though there are important halibut grounds in Northern British Columbia waters. The year 1916–1917 was the most profitable in the history of Canadian fisheries, owing to rising prices and increased demand for fish when meat supplies were reduced by war demands. The total value of the catch for that fiscal year was over $39,000,000. Of this amount, $14,600,000 was credited to British Columbia and $10,000,000 to Nova Scotia. See FISH AND FISHERIES.

Manufactures. Canada has all the raw material needed to develop vast manufacturing enterprises. However, other industries have yielded good results and various pioneer activities in most localities engaged first attention for many years. Notwithstanding other important interests, there were nearly 16,000 manufacturing establishments in 1905; in 1915 they had increased to more than 27,000. The Dominion at last "has found herself," as a Canadian publicist states the case, since the beginning of the World War in 1914. Naturally, munition plants were erected in numbers; these demanded iron, steel, copper, etc.; all industry received a new awakening, and manufacturing of all kinds received an impetus which will never be lost. The total value of manufactured articles is over $1,500,000,000 per year.

Transportation. See RAILROADS OF CANADA; CANALS OF CANADA.

Canada and the World War. The Dominion needed no urging from the mother country to rush to the defense of the empire, endangered by the German onslaught upon the liberty of free peoples. Only a few hours after Great Britain declared war against the Teutonic powers a call was issued for the meeting of Parliament. The Governor-General, in addressing that body at its first session, August 18, 1914, prophesied that—

"* * * the spirit which animates Canada inspires His Majesty's dominions throughout the world, and we may be assured that united action to repel the common danger will not fail to strenghten the ties that bind together these vast dominions."

Sir Wilfrid Laurier, leader of the Liberals, the Opposition party, surrendered politics and declared that his party would join with stout hearts—

"* * * to fight for freedom against oppression, for democracy against autocracy, for civilization against reverson to that barbarism in which the supreme law, the only law, is the law of might."

The first appropriation of Parliament was for $50,000,000 for war expenditures, and a call was made for volunteers for overseas duty. The response was instant; not only did soldiers come forward in response to the first call for men, but private purses were opened for the cause. One man gave $500,000, another $100,000, to equip regiments and batteries. During the first two years of the war there were 361,861 enlistments for active service; this number was increased to over 450,000; about 390,000 had gone to Europe, the remainder being held in reserve in Canada. Particular instances of patriotic response are worthy of record, but only two of many can here be recorded. At Perdue, Sask., out of a total population of 500, eighty-seven men joined the colors at Firdale, Man., in 1917 not an unmarried man between the ages of eighteen and forty-five remained at home.

There was eventually a limit to voluntary enlistments, yet more men were needed to increase the ranks in France and to replace losses. For a year conscription was discussed. The example of the United States in adopting conscription encouraged those in charge of the government, and in 1917 the elections were bound up with the question of drafting men for service. The people of Quebec, under the leadership of Laurier, stoutly resisted conscription, offering to retire from the Dominion if it were adopted and this attitude was embarrassing to the other provinces. The French-Canadians had borne little part in voluntary enlistments, and refused to be coerced. However, loyalty to the cause in other provinces gave the conscriptionists a large majority.

Special Service. While Canada's chief military effort was concentrated on the Canadian expeditionary force on the western front, the Dominion made a variety of other contributions to the war. A notable example was in the air service. Unofficially it is said that thirty-five per cent, or more than 13,000, of the British air pilots in France were Canadian, a remarkable record in itself. Other Canadian units, such as railway troops and hospitals, served in Palestine, Macedonia and Greece. Another corps which left Canada was trained for service with the tanks, an imperial service like the air force.

Casualties and Honors. The number of killed, wounded and missing totaled about 165,000 men. Of these a few more than 45,000 were killed or were believed to be dead; of the wounded nearly 40,000 recovered and returned to the front.

Canada's soldiers in France won undying fame, and were dreaded as combatants by the Germans, for they neither gave nor asked quarter and took few prisoners. Their heroism at Ypres and at Chemin des Dames will forever form one of the most brilliant pages of the history of the great conflict. The list of honors won in the field is as follows:

Victoria cross	30
D. S. O.	432
Bar to D. S. O.	18
Military cross	1,467
Bar to M. C.	61
D. C. M.	939
Military medal	6,549
First bar to M. M.	227
Second bar to M. M.	6
Meritorious service medal	119
Mentioned in dispatches	2,573
Royal Red Cross	130

Contributions of Munitions. One of the Dominion's most important contributions to the allied cause was in the department of munitions. During the last six months of 1917 no less than fifty-five per cent of the total British output of eighteen-pounder shrapnel shells came from Canada, and most of these were complete rounds of ammunition which went direct to France. Canada also contributed forty-two per cent of the total 4.5-inch shells, twenty-seven per cent of the six-inch shells, twenty per cent of the sixty-pounder high explosive shells, fifteen per cent of the eight-inch and sixteen per cent of the 9.2-inch shells. In addition Canada supplied no less than 450 miles of rails torn up and shipped direct to France.

The munitions board also let contracts for ships amounting to $70,000,000, representing forty-three steel and fifty-eight wooden ships, aggregating 360,000 tons.

The following details of munition production are impressive:

Total number of shells produced 60,000,000.

Approximate number of components represented by above for which imperial munitions board has let separate contracts, 670,000,000.

Quantity of high grade explosives and propellants produced, 100,000,000 pounds.

Value of orders placed by the British government through the imperial munitions board, $1,200,000,000.

Approximate number of contractors in Canada among whom contracts for munitions have been distributed, 1,000.

Number of workers engaged in war contracts, 200,000 to 300,000.

Approximate number of persons employed in handling stores in transportation and other collateral organizations, 50,000.

Approximate total number of workers, 350,000.

Government. The Dominion is as democratic in its form of government as any other country in the world. Premier Robert Borden in 1917 thus summed up Canada's freedom of political action:

Canada is a state within a greater state, the Empire itself. Our country enjoys a constitution granted nearly fifty years ago and formulated by the wisdom of the Fathers of Confederation, men whose names still stir the hearts of all Canadians, Macdonald, Cartier, Brown and Tupper. Within the limits of that constitution the people of Canada govern themselves, and each citizen exercises his individual influence in determining how his country shall be governed. That is a right established by the principles upon which democratic government is based.

The Dominion is really a federation of states known as provinces, united under the British North America Act. The chief executive is nominally the sovereign of Great Britain; his personal representative in Canada is the Governor-General, personally appointed by the king, for a term of five years. The Governor-General is assisted by a council, consisting of a Prime Minister and from sixteen to twenty other Ministers, who are heads of departments. The legislative authority rests with a Parliament, consisting of two houses, the Senate and the House of Commons. The Senate consists of members who are nominated by the Governor-General and hold their positions for life. Each Senator must be a born or naturalized subject, thirty years of age, and possessed of real or personal property to the value of at least $4,000 in the province for which he is appointed. The House of Commons consists of members elected by the people for five years and apportioned among the provinces according to population.

In 1917 every province in Canada but Quebec gave women the right to vote for provincial candidates, and the same year, by a special war elections act, female relatives of men in the service were permitted to vote for Parliamentary candidates. In 1918 plans were being laid to make full woman suffrage permanent and general throughout the Dominion.

The Dominion government enacts all criminal law, establishes and maintains the penitentiaries and also enacts all laws relating to bankruptcy, solvency, marriage and divorce, naturalization, aliens and Indians, and in general legislates upon all subjects not expressly assigned to the provincial legislatures. Each province has a separate Parliament and is independent in all local matters. The provincial Parliaments are chosen by popular suffrage, and the executive head of each province is a Lieutenant-Governor appointed by the national government. Except in Nova Scotia and Quebec the provincial Parliaments are composed of one chamber, generally known as the Legislative Assembly.

The administration of justice is based on the English system, except in the province of Quebec, where the old French law prevails. Each province has its lower courts, which have jurisdiction within the county, and also a supreme court, whose jurisdiction extends over the province. The courts having jurisdiction throughout the Dominion are the exchequer court and the supreme court, which is the ultimate court of appeal in civil and criminal cases. Under certain conditions cases may be appealed to the king's privy council.

County and Local Government. In *Ontario* the county councils are composed of councillors elected by "county council divisions," the number of which depends on the population of the county. The assembly has provided for the election of a mayor and three aldermen for each ward in cities. Any community with a population over 10,000 may become an incorporated city. Every town has a mayor and three councillors for each ward when there are less than five wards, or two councillors when there are more than five. A township or a village has a reeve and four councillors. All officers are elected by general vote except in cities and townships divided into wards; then election is by wards. Widows and unmarried women who are rated as taxpayers can vote.

In *Quebec* the county councils are composed of the mayors of the "local municipalities"—that is, the parishes, towns and villages, each of which is governed by seven councillors who elect the mayor from their own number. As in Ontario, cities have special acts of incorporation.

In *New Brunswick* the county councils consist of two councillors from each parish and of a warden chosen annually by the council. Cities are specially incorporated and elect their own mayor and aldermen.

In *Nova Scotia* the councils are elected by the taxpayers, one councillor for each district; a few districts, enumerated in the law, have two councillors. Town councils are composed of a mayor and not less than six councillors. All the towns are now subject to a general act passed by the provincial legislature.

In *Manitoba* the city and town councils consist of a mayor and two aldermen or councillors for each ward; the village council is composed of a mayor and four councillors. In a rural district the chief executive is the reeve.

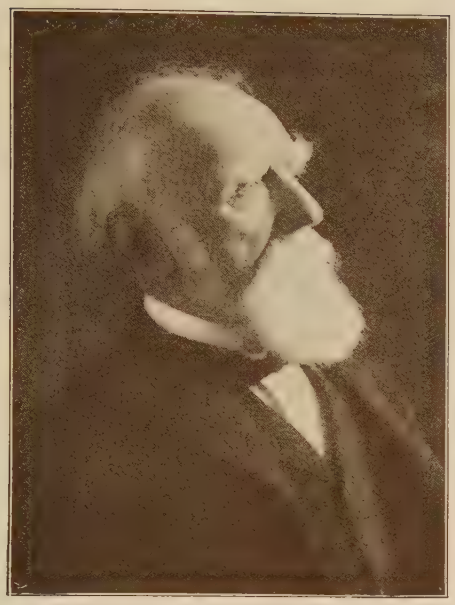
In *Saskatchewan* there is a provincial department of municipal affairs. The minister or commissioner has general superintendence in county and local matters. In cities the councils consist of a mayor, elected annually, and from six to twenty aldermen; in towns, they consist of a mayor and six councillors, three elected each year; in villages the governing body is composed of three councillors. In rural municipalities the council consists of a mayor and one councillor for each division (the rural municipality comprises 324 square miles) in six equal divisions.

In *Alberta* the provincial minister of public works has supervision of municipal affairs. Rural municipalities and towns are governed under the Consolidated Ordinances of the North West Territories of 1905, which provide a council of a reeve and four councillors for the rural districts, and a mayor and six councillors for the towns. Cities are governed under special charters.

In *British Columbia* townships and rural districts are governed by a reeve and a council of four to seven members. Councils of cities established since 1892 consist of a mayor and five to nine aldermen. Nanaimo, New Westminster, Victoria and Vancouver are governed under special statutes. Mayors and reeves are elected annually by general vote, aldermen and councillors by wards where such exist, otherwise also by general vote.

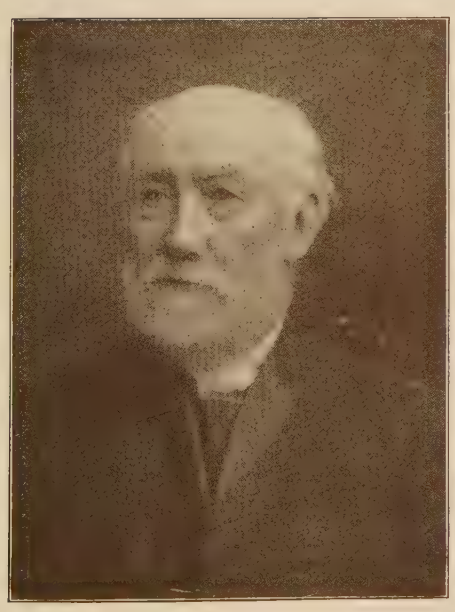
History. The Sagas of Iceland tell of the voyages of the Vikings, Eric and Leif, to the shores of North America, and it was by them, probably, that Canada was first visited. These ventures, however, amounted to nothing, and John Cabot made in 1497 the first real discovery of the North American continent. He planted on the shores of Newfoundland the standard of England, and it was on this that Great Britain based her claim to America. Within twenty years after Cabot's visit, fishermen—English, Basque and Breton—began to visit the cod banks in great numbers. The French explorers entered Canada early in the sixteenth century, and the energy and good fortune of the French allowed them for a time to outstrip the British in the newly found territory. Jacques Cartier, the greatest of these early explorers, sailed three times to the New World between 1534 and 1542 and spent the winter of 1535–1536 on the site of Quebec. De la Roque, Sieur de Roberval, made an attempt to found a colony at Cape Rouge in 1541, but his attempt failed utterly. For fifty years from this time France paid little attention to Canada, although French fishermen still frequented the cod banks. The English however, had by no means forgotten it. In 1583 the first attempt at an English settlement was made by Sir Humphrey Gilbert, but his colony at Saint John's Newfoundland, was short-lived. The first permanent settlement in Canada was made at Quebec in 1608 by Champlain and a few years later a temporary settlement was made at Montreal. It was by Champlain, too, that the first alliance was made with the Hurons and Algonquins, which led later to the conflicts with the Iroquois. Quebec rapidly became the center of the fur trade, upon which the prosperity of New France—as French territory in Canada was called—was based from first to last.

Richelieu in 1627 organized the Company of New France, which held sway in Canada until 1663 and possessed the monopoly of the fur trade. Meanwhile, the Jesuits had appeared in Canada, and for many years they exercised the most powerful influence over civil affairs there. When Colbert came to power in France under Louis XIV, the treatment of Canada by France was bettered



LORD STRATHCONA

SIR JAMES P. WHITNEY



REV. ALBERT CARMAN

WILLIAM HENRY DRUMMOND

EMINENT CANADIANS

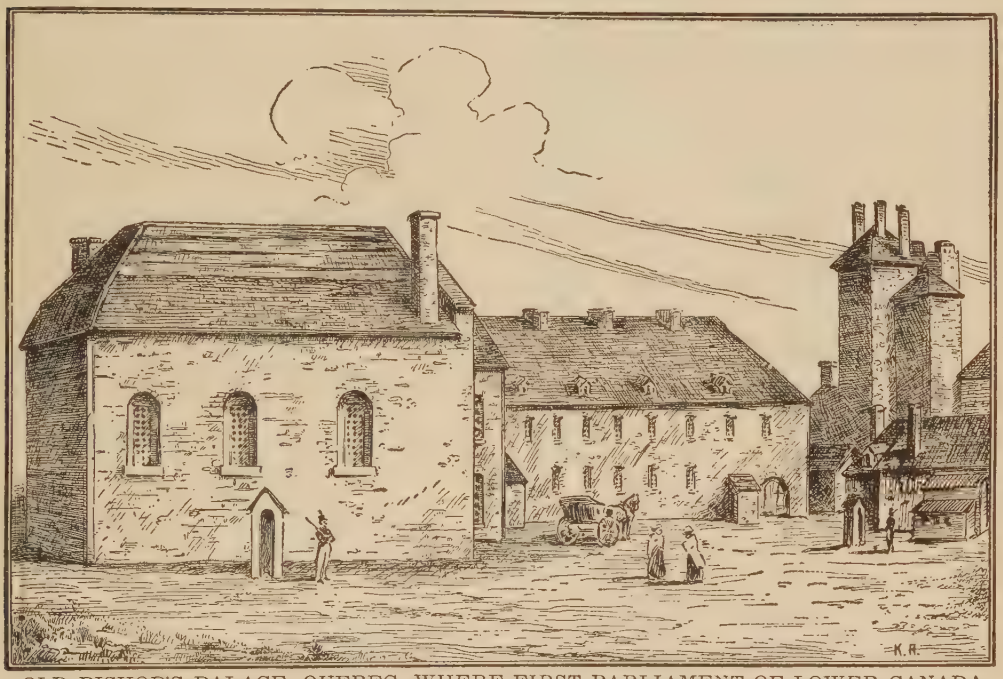
somewhat, because he realized the value of the colony to the mother country. The fur trade was regulated by new rules, and women were taken to the colony from France as wives for the colonists. In 1672 Frontenac was made governor of New France, and it was under his rule that La Salle explored the upper Mississippi and that military posts were established at Niagara, Mackinac and in the Illinois territory.

There had been, as early as 1629, clashes between the French and English in Canada, but it was not until the outbreak, in 1689, of the first of the so-called French and Indian Wars, that the real contest between the French and English for supremacy in North America began. In 1763, by the Treaty of Paris, France ceded to Great Britain Canada and all the territory east of the Mississippi, except the city and district of New Orleans, and renounced all claims to Acadia.

For some years subsequent to this time, the Canadian, who had been harassed for so long by war, had a period of rest. The French in Canada found that their affairs were as well looked after under the new, as under the old, government, and that they were to be allowed the practice of their religion, and very few of them left Canada. From 1760 to 1764 the country was under military government, and for the ten years following 1764 it was under a provisional government which consisted of a governor general, assisted by an executive council. In 1774 the Quebec Act was passed, which united to Canada the Great Lake territory, allowed Roman Catholics the free exercise of their religion and vested the rule of the territory in a governor and a legislative council appointed by the crown.

Shortly after the passage of this act occurred the outbreak of the American Revolution. This was an important crisis in the history of Canada. Emphatic appeals were made to the Canadian French to join the American colonies in their rebellion; the country was invaded and seemed for a time destined to come under the control of the thirteen colonies. The province remained loyal to England throughout, however, and the restoration of peace in 1783 brought to it a distinct gain in the emigration from the United States to Canada of over thirty thousand American loyalists. These new inhabitants proved to be among the foremost of the real makers of Canada.

The area of Canada, however, was de-



OLD BISHOP'S PALACE, QUEBEC, WHERE FIRST PARLIAMENT OF LOWER CANADA MET IN 1792

creased by the Treaty of 1783, as the territory which forms Michigan, Wisconsin, Ohio, Indiana and Illinois was ceded to the United States. In 1791, by the Constitutional Act, Canada was divided into two provinces, Upper Canada and Lower Canada. Lower Canada had at this time a population of perhaps 125,000, most of whom were of French descent, while Upper Canada had a population of 20,000, who were almost entirely English. Each division was given a government of three branches: a legislative council to be appointed by the king, an assembly chosen by popular vote and a governor and executive council to be appointed by the king. English laws and institutions were not imposed on the French provinces. New Brunswick, Nova Scotia, Cape Breton and Prince Edward Island were given administrations similar to those of the other two provinces.

The Constitutional Act by no means settled the difficulties in Canada, as from the first much dissatisfaction was felt in both provinces. The War of 1812 between England and the United States drew them together somewhat and united them for a time more firmly to the mother country, but after the close of the struggle the dissatisfaction again became apparent. In 1837 both Upper and Lower Canada were disturbed by an insurrection, and in 1840 it became plain to the British government that the wisest policy was to reunite them. In 1840, therefore, the act to reunite the provinces of Upper and Lower Canada became a law. Provision was made under the new constitution for a legislative council, whose members were to be appointed for life by the governor; for a legislative assembly, to consist of an equal number of members from Upper and Lower Canada; for a governor, to be appointed by the Crown, and for an executive council, to be chosen by the governor from the legislative council and the legislative assembly.

Formation of the Dominion. By an act of the British Parliament in 1867, New Brunswick, Nova Scotia and Upper and Lower Canada were formally joined into one Dominion of Canada, and British Columbia and Prince Edward Island were added later. The legislature of Newfoundland decided in favor of joining the dominion, but the popular vote was against the union, and Newfoundland remained separate. The vast territory of the Hudson's Bay Company was purchased by the Dominion in 1869, and in 1884 this led to an insurrection of colonists and natives under Louis Riel. The insurrection was put down, and the great so-called Northwestern Territory was afterward divided into Keewatin, Mackenzie, Yukon, Assiniboia, Saskatchewan, Alberta and Athabasca. These last four were in 1905 united into two provinces, Alberta and Saskatchewan.

The first French-Canadian to become Premier was Sir Wilfrid Laurier, who held that office continuously from 1896 to 1911. During his administration and that of his successor, Sir Robert Borden, there was great development in the Dominion; particularly notable was the rapid growth of the great northwest, the "prairie provinces." The Canadian map was materially changed

CANADA, BEFORE 1912

in 1912, when vast, unorganized territories were cut up and added to the provinces of Quebec, Ontario and Manitoba. The area of Quebec was increased from 351,873 square miles to 706,834; Ontario, from 260,862 to 407,262; Manitoba, from 73,732 to 251,832 square miles.

One great factor in the rapid development of Western Canada was the discovery of the rich gold deposits in the Yukon region. The richest mines which the great "strike" of 1897 developed were on the Canadian side of the Canada-Alaska boundary. The movement westward made known the wonders of the great undeveloped West, and helped to stimulate settlement. The organization of the provinces of Alberta and Saskatchewan served further to attract home-seekers. The completion of the Canadian Northern and Grand Trunk Pacific railroads in 1915 opened up new areas and made it easier for

those already on the ground to market their products.

The part Canada took in the World War has already been described. Sir Robert Borden continued in office after the election of 1917, which was a referendum on the conscription issue. He represented Canada at the peace conference, in which the Dominion had the status of an independent nation.

The Dominion made a notable record in the work of helping its returned fighters find a place again in the activities of civilian life. A special Department of Soldiers' Civil Reëstablishment was created, the head of which was made a member of the Cabinet. The department was organized into five branches, and through these divisions sick and wounded soldiers were given medical treatment, employment was found for those able to work, and instruction in various handcrafts, trades and professions given those needing such training.

Related Articles. Consult the following titles for additional information:

BIOGRAPHY

Abbott, Sir John J. C.
Aberdeen, John C. G.
Allan, Sir Hugh M.
Allan, (Charles) Grant
Archibald, Sir Adams
Argyle, Ninth Duke of
Arthur, Julia
Baldwin, Robert
Begin, Louis N.
Bell, Robert
Bell-Smith, Frederick B.
Bengough, John Wilson
Blake, Edward
Borden, Sir Robert L.
Bowell, Sir Mackenzie
Brock, Sir Isaac
Brodeur, Louis
Brown, George
Bulyea, George H.
Campbell, Sir Alexander
Carleton, Sir Guy
Carman, Bliss
Cartier, Sir George E.
Chapleau, Sir Joseph A.
Connaught, Duke of
Cotes, Sara Jeannette
Davies, Sir Louis Henry
Dawson, George M.
Dawson, Sir John William
Devonshire, Duke of
Drummond, William Henry
Duncan, Norman
Durham, John George L.
Elgin, James Bruce
Foster, Sir George E.
Frontenac, Comte de
Galt, Sir Alexander T.
Grey, Earl
Haliburton, Thomas C.
Hays, Charles M.
Hincks, Sir Francis
Howe, Joseph
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Hughes, Sir Sam
Landsdowne, Henry C.
Laurier, Sir Wilfrid
Le Moine, James M.
Lighthall, William D.
Lisgar, Lord
Mc Bride, Sir Richard
Mc Gee, Thomas D'Arcy
Macdonald, Sir John A.
Mackenzie, Alexander
Mackenzie, Sir Alexander
Mann, Sir Donald
Minto, Gilbert John
Monck, Charles S.
Montcalm, Marquis de
Mount Stephen, Lord
Osler, Sir William
Papineau, Louis J.
Riel, Louis
Roberts, Charles G. D.
Ross, Alexander
Saunders, Margaret M.
Secord, Laura
Simcoe, John B.
Strathcona and Mount Royal, Baron
Taché, Alexander
Traill, Catherine Parr
Tupper, Sir Charles
Vancouver, George
Van Horne, Sir William C.
Whitney, Sir James P.

CITIES AND TOWNS

See lists under different provinces.

GULFS AND BAYS

Baffin's Bay
Belle Isle, Strait of
Fundy, Bay of
Georgian Bay
Hudson Bay
James Bay
Juan de Fuca
Puget Sound
Saint Lawrence, Gulf of

ISLANDS

Anticosti
Cape Breton
Magdalen
Manitoulin
Queen Charlotte
Sable
Thousand Islands
Vancouver

LAKES

Athabaska
Champlain
Erie
Great Bear
Great Lakes
Great Slave
Huron
Lake of the Woods
Manitoba
Memphremagog
Muskoka
Nipigon
Nipissing
Ontario
Rainy
Saint Clair
Superior
Winnipeg
Winnipegosis

MOUNTAINS

Cascade Range
Hooker, Mount
Laurentian Mountains
Robson, Mount
Rocky Mountains
Saint Elias Mountains
Selkirk Mountains

DISTRICTS

Assiniboia
Athabaska
Franklin
Keewatin
Klondike
Labrador
Mackenzie
Ungava

POLITICAL DIVISIONS

Alberta
British Columbia
Manitoba
New Brunswick
North West Territories
Nova Scotia
Ontario
Prince Edward Island
Quebec
Saskatchewan
Yukon

RIVERS

Assiniboine
Athabaska
Chaudiere
Churchill
Columbia
Fraser
Gatineau
Kootenay
Mackenzie
Miramichi
Nelson
Ottawa
Red River of the North
Restigouche
Saguenay
Saint John
Saint Lawrence
Saskatchewan
Stikine
Yukon

LAW AND GOVERNMENT

Admiralty Court of Canada
Cabinet
Exchequer Court of Canada
Executive Council
Governor-General
Judicial Department of Canada
Legislative Assembly
Lieutenant-Governor
Money, in Canada
Parliament
Premier
Privy Council
Province
Royal Northwest Mounted Police
Savings Bank, Canadian
Supreme Court of Canada
Territory

HISTORY

Acadia
Aix-la-Chapelle, Treaties of
British North America Act
Clayton-Bulwer Treaty
Dominion Day
Empire Day
Erie, Battle of Lake
Flags of the British Empire
Fort Niagara
French and Indian Wars
Hudson's Bay Company
Jay Treaty
Louisburg, Sieges of
Lundy's Lane, Battle of
Quebec, Battle of
Quebec Resolutions
Quebec Tercentenary
Queenston Heights, Battle of
Red River Rebellion
Revolutionary War in America
Rupert's Land
Saskatchewan Rebellion
Thames River, Battle of the
Union, Act of
Webster-Ashburton Treaty
World War

Outline of Canadian History

I. Discovery, Exploration and Settlement
- (1) Age of discovery, 1000–1603
  - (a) Norsemen
  - (b) John and Sebastian Cabot
  - (c) Cortereal and Verrazano
  - (d) Jacques Cartier
    - (1) Sailed up the St. Lawrence
    - (2) Three voyages
- (2) Age of exploration and settlement, 1603–1663
  - (a) Settlement of Acadia, 1604
    - (1) Established by the French
    - (2) Destroyed by the English
    - (3) Changes in ownership
  - (b) Founding of Quebec, 1608
    - (1) Explorations of Champlain
    - (2) Champlain and Indian wars
    - (3) Progress of the settlement
  - (c) Founding of Montreal, 1642
  - (d) The work of the missionaries
    - (1) As pioneers and explorers
    - (2) Among the Indians
  - (e) The Hundred Associates
    - (1) Monopoly of fur trade
    - (2) Bringing of settlers
  - (f) Internal strife
  - (g) Indian raids
- (3) Canada becomes a royal colony of France, 1663
  - (a) Opposing interests of
    - (1) Priests
    - (2) Traders
    - (3) Royal governor
  - (b) Comte de Frontenac
  - (c) Opening of the interior, 1670–1682
    - (1) Explorations of Marquette and Joliet
    - (2) Voyages of La Salle
    - (3) Hudson's Bay Company founded, 1670
  - (d) Social and economic conditions
    - (1) Despotic government
    - (2) Trade controlled by great companies
    - (3) Feudalism

II. The Struggle for New France (see French and Indian Wars)
- (1) Queen Anne's war, 1697–1713
  - (a) Attacks on English colonists
  - (b) Capture of Port Royal
  - (c) Acadia and Newfoundland ceded to England, 1713
- (2) King George's war, 1744–1748
  - (a) Only a part of the struggle between France and England
  - (b) Capture of Louisburg
  - (c) Treaty of Aix-la-Chapelle; Louisburg restored to France
- (3) The fall of New France
  - (a) Braddock's march
  - (b) Exile of the Acadians
  - (c) Siege and capture of Louisburg
  - (d) Capture of Quebec
  - (e) Minor battles
    - (1) Siege of Ticonderoga
    - (2) Niagara taken by the English
    - (3) Montreal surrenders
  - (f) Peace of Paris, 1763
    - (1) End of French rule in North America
    - (2) New France becomes an English colony.

III. The Early Years of British Rule, 1763-1815
- (1) Problems of organization and control
  - (a) Military rule
  - (b) Conspiracy of Pontiac
  - (c) The Quebec Act, 1774
    - (1) Enlarged the province
    - (2) Provided government by the governor and council
    - (3) French civil law, the law of the province
  - (d) The Constitutional Act 1791
    - (1) Divided Quebec into Upper and Lower Canada
    - (2) Provided governor, executive council and two legislative bodies for each province
    - (3) All officials appointed and dismissed by the home government
  - (e) The failure of representative government as established
    - (1) Opposing interests of the Assembly and councils
    - (2) The Assembly practically without power
- (2) Opening of the West
  - (a) Development of the fur trade
  - (b) Rivalry of the fur companies
  - (c) Exploration
  - (d) Lord Selkirk's scheme
  - (e) Union of the fur companies
- (3) The war of 1812–1814
  - (a) Causes
  - (b) Campaigns and battles
  - (c) Results

IV. The Struggle for Responsible Government, 1815–41
- (1) The issues
  - (a) Demand of the Assembly to control the revenue
  - (b) Responsibility of the executive
- (2) Popular leaders
  - (a) Louis Joseph Papineau
  - (b) William Lyon Mackenzie
  - (c) Robert Baldwin
  - (d) Egerton Ryerson
  - (e) Joseph Howe
  - (f) Louis H. La Fontaine

(3) Rebellion and reform
(a) Rebellions
(1) Papineau and Mackenzie
(2) Quickly suppressed
(3) Caused popular reaction against reform
(4) Led to appointment of Lord Durham as governor-general
(a) Durham's report
(b) Act of Union, 1840; in effect, 1841
(b) Reform in New Brunswick
(1) Executive and Legislative Councils separated
(2) Conditional control of revenue granted Assembly
(c) Nova Scotia
(1) "Twelve resolutions" by the Assembly and submitted to the British Government, 1837
(2) Some desired changes in government granted
(a) Separation of the two legislative bodies
(b) Partial control of public funds by Assembly
(3) Principle of responsibility to the Assembly not yet allowed
(4) Triumph of responsible government, 1841–48
(a) The first union Parliament
(b) Lord Elgin puts the principle into operation
(c) After several years in force in other provinces
(5) Fruits of responsible government
(a) Control of appointments, crown lands and public funds
(b) Provinces free to regulate their own tariffs
(c) Establishment of a system of muncipal government, 1849
(d) Abolition of seigniorial tenure
(e) Secularization of Clergy reserves, 1854
(f) Reciprocity treaty with the United States, 1854
(g) The legislative Council of Canada made elective
(h) Government established in British Columbia

V. Confederation
(1) Movement for union
(a) In the Canadas
(1) The coalition ministry in favor
(2) Caused by friction between the sections
(b) Charlottetown Conference
(1) For union only of the Maritime Provinces
(2) Confederation overshadowed local issues
(3) Decided to hold general conference at Quebec
(c) Quebec conference, representing Canada, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland
(1) "Fathers of Confederation"
(a) Sir John A. Macdonald
(b) Hon. George Brown
(c) Sir Georges Etienne Cartier
(d) Sir Etienne P. Taché
(e) Sir Alexander T. Galt
(f) Hon. Thomas D'Arcy McGee, Sir Oliver Mowat, Sir Charles Tupper, Sir Adams G. Archibald, Sir Leonard Tilley,
(2) The Quebec resolutions
(a) In favor of union
(b) Plan of government mapped out
(c) Referred to provinces
(d) Reciprocity treaty ended Fenian raids
(2) British North America Act
(a) Passed by the British Parliament in March, 1867
(b) Terms of the Act
(c) In effect on Dominion Day, July 1, 1867; Ontario, Quebec, Nova Scotia and New Brunswick included in Dominion.

VI. Growth and Expansion
(1) Development of the west
(a) Hudson's Bay Company surrenders its territorial rights
(b) North West territories
(1) Northwest rebellion
(2) Royal Northwest Mounted Police
(c) Manitoba (1870) and British Columbia (1871) join the Dominion as provinces
(d) Prince Edward Island enters Confederation (1873)
(e) Transcontinental railway
(2) Industrial and commercial progress
(3) Foreign affairs

VII. The Twentieth Century
(1) Internal development
(a) Territorial changes
(1) Alberta and Saskatchewan become provinces
(2) Yukon organized
(3) Ontario, Quebec and Manitoba enlarged
(b) Transportation
(c) Industries
(d) Education
(e) Political affairs
(1) Important legislation
(2) The Borden government
(3) The World War
(2) Canada's position as a nation

Outline on The Dominion of Canada

I. Location and Extent
- (a) Latitude
- (b) Longitude
- (c) Boundaries
- (d) Area
- (e) Comparison with other countries

II. Surface and Drainage
- (a) Coastal plain
- (b) Appalachian highlands
- (c) Great central plain
- (d) Rocky Mountain highlands
- (e) Pacific slope
- (f) River systems
- (g) Lakes

III. Climate
- Natural conditions expected
- (b) Changes wrought by physical conditions
- (c) Average temperature
  - (1) Maritime provinces
  - (2) Ontario and Quebec
  - (3) Northwest provinces
  - (4) Pacific slope
  - (5) Yukon
- (d) Average rainfall in various sections
- (e) Need for irrigation
  - (1) Extent of irrigation service

IV. Industries
- (a) Mineral resources
  - (1) Gold and silver
  - (2) Iron, copper, coal, lead, etc.
  - (3) Oil
  - (4) Granite and building stone
  - (5) Where each is found
- (b) Agricultural products
  - (1) Cereals
    - (a) Wheat
    - (b) Oats
    - (c) Rye
    - (d) Barley
    - (e) Alfalfa
    - (f) Corn
    - (g) Other grains
  - (2) Fruits
    - (a) Apples
    - (b) Peaches
    - (c) Pears
    - (d) Berries
    - (e) Value of annual crop
    - (f) Provinces leading in production
  - (3) Market gardening
  - (4) Live stock and dairy products
    - (a) Great grazing sections
    - (b) Packing-house centers
    - (c) Domestic and foreign markets
    - (d) Creameries
    - (e) Milk and butter
- (c) Manufactures
  - (1) Natural locations of districts
  - (2) Leading industries
    - (a) Food products
    - (b) Textiles
    - (c) Iron and steel
    - (d) Lumber
    - (e) Leather and leather goods
    - (f) Paper and printing
    - (g) Rank with other nations
- (d) Commerce
  - (1) Domestic commerce
    - (a) By rail
    - (b) By water
      - (1) Inland water routes
    - (c) Coasting trade
      - (1) Nations which compete for carrying trade
        - (a) Proportion of foreign vessels
        - (b) Reasons for Canadian proportion
      - (2) Principal coast trade routes
  - (2) Foreign commerce
    - (a) With what countries
    - (b) Value of annual exports
    - (c) Value of annual imports
    - (d) Principal countries engaged in carrying trade

V. Population
- (a) Per cent of annual increase
- (b) Center of population
  - (1) Rate of progress westward
  - (2) Density of population
- (c) Comparative growth of cities and rural communities
- (d) Immigration
- (e) Races and colors represented

VI. Government
- (a) General character
- (b) Departments
  - (1) Executive
    - (a) Governor-general
    - (b) Cabinet
  - (2) Legislative
    - (a) Parliament
      - (1) Senate
      - (2) House of Commons
  - (3) Judical
    - (a) Supreme court
    - (b) Courts of limited jurisdiction
      - (1) Exchequer court
      - (2) Admiralty court
- (c) Provincial governments
  - (1) In what ways sovereign
  - (2) In what ways subordinate
- (d) Territories

VII. Education in Canada

VIII. Cities
- (a) List of twenty-five largest
- (b) Forms of government
  - (1) Commission form
  - (2) Large elective list of officers

IX. History. See Outline of Canadian History.

Questions on Canadian History

When and where are the Norsemen said to have landed about A. D. 1000?

Who was Leif Ericsson?

Who were the Cabots, and why are they famous?

Why were the explorations of Cartier important?

When was Acadia settled? By whom?

When was Quebec founded? Who was the founder? Give a brief account of his work as a pioneer.

What were the conflicting internal interests which threatened the existence of the colony?

Name three explorers, not already mentioned, who traveled through the interior of the New World.

Give a brief account of the discovery of Hudson's Bay.

When and by whom was Montreal founded?

When did the Hudson's Bay Company receive its charter? What can you say of the influence this company has exerted on Canadian history?

Who discovered the Mississippi River? When did La Salle reach its mouth?

What is meant by the expression, "the struggle for New France?"

Summarize the principal incidents of King William's War. What were its most important results?

Show as well as you can the connection of these wars in America with general European history.

Explain General Wolfe's plan for the capture of Quebec. What was the importance of his victory?

Who was Pontiac? What was the purpose of the great conspiracy?

What were the important provisions of the Quebec Act?

When was Canada divided into Upper and Lower Canada? By what name is this Act known?

Outline the method of government at that time.

What can you say about the explorations of Sir Alexander Mackenzie?

Why was the fur trade instrumental in opening the West?

What were the causes of the War of 1812?

Name several important victories won by General Brock.

Who was Laura Secord?

Explain briefly Canada's position in the War of 1812.

What were the leading issues in the struggle for responsible government?

Name four popular leaders of the movement.

Who was the Earl of Durham? What was the importance of his famous report?

When was the Act of Union passed?

When did it go into effect?

Who was Lord Elgin?

Name six "fathers of Confederation."

What were the Quebec resolutions? What did they propose? How were these resolutions put into effect?

Who was the first Premier of the Dominion?

When was the British North America Act passed? What is the anniversary of the day on which it came into effect?

What was the cause of the Red River Rebellion? Of the Northwest Rebellion? Who was the leader of both?

When did Manitoba and British Columbia become provinces?

When was the Roy l Northwest Mounted Police organized? Outline the duties of this force.

When did Sir Wilfrid Laurier become Premier? Name some of the important events of his administration.

When was Queen Victoria's diamond jubilee celebrated?

Give a brief account of the Quebec Tercentenary Celebration.

What was the principal issue in the election of 1911? Of 1917?

Name the last two Governors-General.

How many soldiers did Canada send to the World War?

What provision was made for support of soldiers returned from Europe?

To what extent did Canada make munitions during the war?

Who commanded Canada's forces on Europe's battlefields?

CANADA BALSAM, *bawl'sam*, a resinous substance obtained from the Balm of Gilead fir, common in Canada and the United States. It is used in medicine and in making

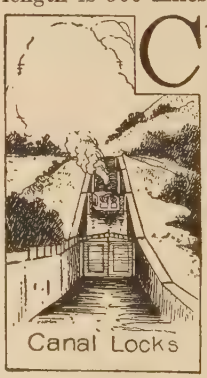
CANADA THISTLE

varnishes, and because of its almost perfect transparency, in the preparation of objects for the microscope. This balsam is also utilized as a cement for joining the lenses of optical instruments. It has an odor similar to that of turpentine and is quite bitter to the taste.

CANADA GOOSE, an American wild goose, common in temperate North America. Its breeding grounds are the regions between the Yukon valley and Indiana. It is from thirty to thirty-six inches long, is brownish above and lighter below, with head, neck, bill and feet black and with a white patch over each cheek. In early spring Canada geese may be seen flying north at a considerable distance above the earth in a > shaped flock. At their heads is a leader, an old gander, who directs the flight, and the others following may often be heard giving their loud, coarse "honk" as they fly past.

CANADA THISTLE, one of the most common and injurious of all weeds, introduced into the United States and Canada through the medium of imported grains. It grows from the latitude of Newfoundland south to that of Virginia, propagating itself by seeds and by its creeping roots. It bears purplish flowers about three-quarters of an inch in diameter, within the tubes of which is formed a nectar which lures the bees, butterflies and other insects. These carry away from the flowers innumerable pollen grains, and thus aid in the distribution of the plant. This weed grows very freely in large open fields and among various kinds of grains. To prevent the growth of the Canada thistle, diligent cultivation of the land and alternate sowing of heavy, hardy crops are necessary. Infested fields are sometimes cleared of the pest by sheep which graze upon the land.

CANA'DIAN RIVER, a river that rises in the northeastern part of New Mexico and flows easterly through Texas and Oklahoma and unites with the Arkansas at Tamaha. It forms a part of the former boundary between Oklahoma and Indian Territory, and is the most important tributary of the Arkansas. The quantity of water it carries varies greatly at different seasons. Its length is 900 miles.



Canal Locks

CANAL. The rôle taken by canals in the history of civilization is similar to that taken by the railroads, but canals antedated railroads by many centuries. Originally, no doubt, men made artificial waterways to help irrigate the land, but the difficulties encountered in traversing deserts, mountains, etc., led them to see the value of transportation canals, and such thoroughfares were built long before the Christian Era.

There is a tradition that the Egyptians constructed a canal across the Isthmus of Suez before 2000 B. C., a predecessor of the modern Suez waterway. About 600 B. C. Nebuchadnezzar opened the royal canal between the Tigris and the Euphrates rivers. While we have no direct evidence of the fact, it is supposed that the Chinese were familiar with canals long before they were

known in Europe, and the Grand Canal, completed by them in the thirteenth century, is the first work of its kind after the beginning of the Christian Era. The Romans constructed many canals for navigation, and these may be considered the origin of the present canal systems of Europe.

How Canals are Constructed. This article deals only with transportation canals. For other kinds see the articles DRAINAGE, IRRIGATION and DRAINAGE CANAL, CHICAGO.

Canals are of necessity excavated on a level and cannot be adapted to a change in surface by grades, as can railroads. When the route traversed is so uneven that the construction of the canal on one level will involve too great expense, it is constructed on two or more levels called *reaches,* and each reach is connected with those above or below by the means of *locks, inclines* or *lifts* (see LOCK). All canals are constructed on practically the same plan. When the excavation is in soft earth, the banks slope and the channel is wider at the surface than at the bottom. When excavated in rock, the banks are usually perpendicular, or nearly so. Canals are carried across valleys on embankments or aqueducts, and culverts are constructed to carry streams below them. The top of the embankment is fashioned into the channel, which is lined with cement, but in case a bridge is used the structure serves as the support of a channel, which is constructed of steel or of wood and may or may not be lined with cement. The construction of a canal often necessitates works of great magnitude, such as deep cuts, high embankments, tunnels and aqueducts, and on account of the expense entailed most canals are government works.

Canals vary in size from a small ditch, excavated to connect two bodies of water, to channels that will float the largest ocean steamships such as the Panama Canal. Those which are constructed for large steamers are known as *ship canals.* In general the bottom of the canal should be twice as wide as the widest boat that is to navigate the channel, and the depth of water should exceed the draft of the largest boats by at least one and one-half feet, since it requires less power to move a boat through a canal having an abundant supply of water than through one whose channel is just large enough to admit of the passage of the boat.

American Canals. The first canal in the United States was constructed around the falls in the Connecticut River at South Hadley, Mass., in 1793. Washington and other leading statesmen early saw the advantages of canals to connect the interior of the country with the Atlantic and with adjoining navigable rivers; yet it was a long time before any extended works were attempted. The Erie Canal, completed in 1825, was really the first enterprise in the country worthy of note.

In 1917 construction work was completed on the enlarged Barge Canal, of which the Erie Canal is an important link. Though canal building suffered a decline after the Civil War, between 1825 and the war a number of waterways were completed, including the Chesapeake and Ohio (1850), between Washington, D. C., and Cumberland, Md.; the Illinois and Michigan Canal (1848), between Chicago and La Salle, Ill.; and the system of locks at Sault Sainte Marie, Mich. (1855). All of these are described in these volumes under their proper headings.

The Hennepin Canal, connecting the Illinois and Mississippi rivers, was started in 1892 and completed in 1908, but canal building was practically at a standstill in the United States during the period of rapid railroad expansion. Since 1900, however, there has been renewed activity. The completion of the New York canal system, already referred to, was one of the most notable feats in this field of activity. The year 1914 saw the completion of a canal across Cape Cod, a third great lock at Sault Sainte Marie, and, most important of all, the great waterway across the Isthmus of Panama.

The following year work was begun on a fourth great lock at Sault Sainte Marie, and operations were completed on a canal around the Dalles Rapids, on the Columbia River. The new Sault lock was completed in 1918. In 1917 the Lake Washington Canal, between the lake and Puget Sound, was opened to navigation. Considerable progress has also been made on canal construction on the Ohio River. After America entered the World War the subject of transportation by water became an important issue in view of the railroad congestion, and great effort was made to utilize to the fullest extent the country's great system of inland waterways.

European Canals. Canal construction has made rapid progress in Europe since the

twelfth century. By 1250 the "low countries" were traversed by an elaborate system of artificial waterways, and to-day Holland has over 2,400 miles of canals and Belgium about 1,345 miles. The French system has an aggregate mileage of about 3,000, and in 1917, after three years of devastating warfare, plans were being laid for a further extension of the system. Among the notable French canals are the Languedoc, joining the Bay of Biscay and the Mediterranean Sea, and the Canal du Nord, connecting Paris and the Lille district.

Out of a total of 7,038 miles of navigable waterway in Germany, 5,815 miles are natural. The most important German canal is the Kaiser Wilhelm, or Kiel, connecting the Baltic and the North seas. During the World War this canal served as a harbor for the Grand Fleet. Both in France and in Germany extensive use is made of canalized rivers. Russia and Austria also have canal systems of considerable local importance, and in Greece is the famous Corinth Canal, across the isthmus which connects Northern Greece and the Peloponnesus.

Of the British canals the most notable is the Manchester Ship Canal, extending from Manchester to the estuary of the Mersey River. Others of importance include the Grand Canal, between Dublin and Ballinasloe; the Caledonian Canal, extending across Scotland; and the canal between the firths of Forth and Clyde. During the World War consideration was given to improving the British canal system, which was admitted to be inferior to that of the continent, but there were many difficulties in the way. Any decided improvements would necessitate expensive canalization of rivers, and a good deal of excavation and lock construction.

Related Articles. Consult the following titles for additional information:

Caledonian Canal
Canals of Canada
Cape Cod Canal
Erie Canal
Manchester Ship Canal
New York State Barge Canal
Panama Canal
Sault Ste. Marie Canal
Suez Canal
Welland Canal

CANALS OF CANADA. The Canadian government is rapidly improving its system of inland waterways by the construction of canals around rapids in navigable streams and by connecting lakes and rivers so as to shorten the distance between points on the Great Lakes and Montreal, the head of ocean navigation.

The St. Lawrence, with the system of canals and the various lakes, affords a direct line of water communication from the Straits of Belle Isle to Port Arthur or Fort William, at the head of Lake Superior, a distance of 2,233 statute miles. The distance to Duluth is 2,357 miles, and to Chicago, 2,289 miles. Ocean-going steamers may ascend the river as far as Montreal in the open season of navigation; from Montreal westward are nine canals—the Lachine, Soulanges, Cornwall, Farran's Point, Rapide Plat, Galops, Murray, Welland and Sault Ste. Marie, generally known as the Soo. The aggregate length of these canals is seventy-three miles; the total lockage (that is, the height directly overcome by locks) is 551 feet. The number of locks through which a vessel passes in its voyage from Montreal to Lake Superior is forty-eight. These are the canals on what may be called the main line. Geographically the other canals, including the Murray, Trent, Rideau and Ottawa River, may be considered as branches; in operation, however, they serve traffic of a local nature. Improvements of various kinds are constantly being made. For example, parts of the Lachine and Soulanges canals have been lined with concrete walls, the Welland canal has been widened and deepened, the upper entrance to the "Soo" canal widened from 300 to 500 feet, and on the Trent canal work has been done on a direct extension to Lake Ontario. In addition to the canals now in use plans and surveys have been made for new canals. The largest of these is the Georgian Bay Canal, to be constructed from the northeastern corner of Georgian Bay to the Ottawa River, and then in the valley of that river to Montreal. When constructed, this canal will enable ocean-going vessels to pass directly from Montreal to Lake Huron. The total length of canal and canalized river will be over 400 miles, built at an estimated cost of $125,000,000. This canal will shorten the water route for through traffic by 282 miles.

A brief statement of the principal facts of interest in regard to each of the important canals is given below.

St. Lawrence Canals. Lachine Canal is the first of this group. Length of canal, 8½ miles; five locks, each 270 by 45 feet; two lock entrances at each end; average width, 150 feet; lockage, 45 feet; canal extends from Montreal to town of Lachine, thus avoiding the St. Louis rapids. Soulanges Canal, from Cascade Point to Coteau Landing to avoid the Cascade,

Cedar and Coteau rapids in the St. Lawrence. Length of canal, 14 miles; four locks, each 280 by 45 feet; total lockage, 84 feet; depth 15 feet. Cornwall Canal, from Cornwall to Dickinson's Landing, avoiding the Long Sault Rapids. Eleven miles long; six locks, each 270 by 45 feet; total lockage, 48 feet; minimum depth, 14 feet. In the table above, these three canals, together with the Farran's Point, Rapide Plat and Galops canals, are grouped under the heading St. Lawrence.

Murray Canal, extended through the Isthmus of Murray, in Ontario. Length 5⅛ miles; width at bottom, 80 feet; width at water surface, 120 feet; depth below lowest known lake level, 11 feet; no locks.

Welland Canal. See Welland Canal.

Sault Ste. Marie Canal. See Sault Ste. Marie Canal.

Ottawa-Rideau System. This includes the Rideau River and Canal, St. Anne's Lock and the Carillon and Grenville canals. This system extends from Montreal to Kingston by way of Ottawa, a total distance of 245⅝ miles. There are 41 locks ascending and 22 descending, the difference in the number of locks being only between Ottawa and Kingston; east of Ottawa the locks are 200 by 45 feet, but west of Ottawa only 134 by 33 feet.

Chambly-Lake Champlain System, from Sorel to Chambly, thence to St. Johns by the Chambly Canal and up the Richelieu River to Lake Champlain. From Sorel to the international boundary is a distance of 199 miles. The Chambly Canal is 12 miles long, has 9 locks of varied sizes and a total lockage of 74 feet.

Trent Canal is a term applied to a series of water stretches at present available only for local use. Improvements are being made and planned to make it a through route from Lake Ontario to Lake Huron. Two hydraulic lift locks have recently been installed, at Peterborough one with a lift of 65 feet, at Kirkfield another with a lift of 50 feet 5 inches. The Peterborough lock is the largest of its kind in the world.

Saint Peter's Canal, connecting Saint Peter's Bay, on the southern side of Cape Breton, with the Bras d'Or lakes. It is about 2,400 feet long and 55 feet wide, has one tidal lock 200 by 48, four pairs of gates, and a minimum depth of 18 feet.

PRINCIPAL CANALS OF CANADA AND THE ERIE CANAL

CANAL ZONE. See Panama Canal.

CANARY, *ka na'ri,* a small finch, originally from the Canary Islands and Madeira, but introduced into Europe several hundred years ago. It is the most popular of all cage birds because of its cheerful singing and friendly nature. Canaries have been bred in captivity so long that many remarkable varieties have developed, scarcely resembling the greenish little bird of Madeira. The topknots of some, the long, slender shapes of others, the yellows, browns, reds and blacks seen in their plumage are all unnatural. The Scotch fancy canary, with his long, slender, curved body, bent almost to a semicircle, is one of the strangest results of breeding.

In the Harz Mountains and other parts of Germany and in the British Islands, the raising of canaries is quite an important industry, and large prices are paid for the highest type of singing birds. In the United

States a good bird has been bought for a dollar, but sometimes $150 has not been considered too high a price to pay for an especially fine singer. The birds require a clean cage, good seed, some green food, lime and plenty of cold water. Beyond this they need little care and thrive almost anywhere. In the United States the name *wild canary* is often given to the American goldfinch, or thistle bird, which, though entirely different, does somewhat resemble the captive canaries. See AMERICAN GOLDFINCH; BIRDS, *color plate,* Fig. 3.

CANARY ISLANDS, or **CANARIES**, a cluster of islands in the Atlantic Ocean, about seventy miles west of the northwest coast of Africa. They belong to Spain and are so called from the word *Canaria,* derived from *canis,* the Latin for *dog.* When the group was discovered a breed of fierce dogs inhabited the islands, and may have suggested the name. It is also said that it refers to the shape of the largest island. They are thirteen in number, seven of which are of considerable size: Palma, Ferro, Gomera, Teneriffe, Gran Canaria, Fuerteventura and Lanzarote. All are volcanic, rugged and mountainous, frequently presenting precipitous cliffs to the sea. The principal peak is that of Teneriffe, 12,182 feet. The area of the whole has been estimated at 2,807 square miles. The fine climate and the fertility, which owes little to cultivation, justified the ancient name of *Fortunate Islands.* There are no rivers of note, though streams are not infrequent. The exports consist of cochineal, wine, raw silk and fruits.

Of the Guanches, the mysterious tribe who originally inhabited these islands, we know little. The islands were discovered and conquered by the Spaniards between 1316 and 1334; they then passed into the hands of the Portuguese, but were reconquered toward the end of the fifteenth century by the Spaniards, who subdued the inhabitants and now constitute the great bulk of the population. The fortified capital is Santa Cruz, and the city Laguna is the seat of the Roman Catholic bishop. The Canaries form a Spanish province. Population, 1910, estimated, 475,000.

CANARY SEED, the seed of the canary grass. The seed is used as food in the Canaries, Barbary and Italy. It has been successfully cultivated in England and the European continent, where it is used extensively as a food for cage birds.

CANCELLATION, *kan sel la'shun,* in mathematics the process of striking out equal factors in the dividend and the divisor. It is based upon the following principles:

(1) Both dividend and divisor may be divided by the same number, and the quotient is unchanged; or, a common factor may be dropped from dividend and divisor and the quotient remains unchanged.

(2) The numerator and denominator may be divided by the same number and the value of the fraction remains unchanged; or, a common factor may be dropped from numerator and denominator and the value of the fraction remains unchanged.

Cancellation is of advantage in shortening the processes involved in multiplication and division, as in the following:

$$\frac{\overset{2}{\cancel{8}}\times\cancel{3}\times\cancel{9}}{\underset{2}{\cancel{4}}\times\cancel{6}\times\underset{2}{\cancel{18}}} = \frac{2}{4} = \frac{1}{2}$$

CANCER, *kan'ser,* the common name of a disease characterized by the formation of a malignant tumor in some part of the body. A high death rate from cancerous growths is common in all parts of the world among civilized peoples, for cancer most often attacks those who enjoy life's comforts and luxuries. It is decidedly a disease of middle age and old age, rarely afflicting persons below forty. It is believed by some authorities to be of bacterial origin, but on this point no definite proofs have as yet been established. Certain it is that medical authorities have sought long and vainly for a cure for cancer, and health authorities are yearly printing statistics showing the appalling number of deaths due to the disease. It is taxing the best brains and baffling the highest skill in the medical profession.

Certain characteristics are common to all forms of cancer. The growth is always composed of a framework of fibers surrounding a mass of cells and a milky-white cancer juice. Cancerous growths have no set limits, but may pass into surrounding tissues. They tend to spread by means of the veins and lymphatics. Almost one-half of all cancer cases occur in the intestines and the stomach, a fact that ought to impress everyone with the importance of eating moderately and selecting well-cooked, wholesome food. Outside surfaces exposed to injuries and to dirt are more often attacked than protected parts. Cancer of the lip, of

the tongue, and of the inside of the mouth are common in men, and cancer of the breast frequently attacks women. Local irritations, such as might be caused by a pipe stem, or any hard object rubbing against the body, often develop into cancers.

So far as has been discovered, removal of a cancer by the knife is the most reliable form of treatment. A growth in its first stages can nearly always be removed, and the patient may recover his health completely. Delay is the greatest enemy in the history of a cancer case. Any open sore or hard lump that seems persistent should have the attention of a good physician. Very often the incipient cancer is not painful, but this should not lull the victim into a sense of false security. In other cases much harm is done by the use of patent medicines that bring temporary relief from pain and permit the growth to develop until it is too late to cure it. Cancer of advanced stage cannot yet be cured.

Of recent years much has been heard about the X-ray and radium forms of treatment. The beneficial effects of these methods are limited to superficial skin cancers and to certain forms of tumor that are not malignant. Internal cancers are rarely benefited by either the X-ray or by radium, and the excessive cost of the latter makes it unavailable for nearly everyone. See X-Ray.

CANCER (the crab), the fourth sign of the zodiac, entered by the sun on or about the twenty-first of June and quitted a month later. The symbol is ♋. The constellation of Cancer is no longer in the sign of Cancer, but at present occupies the place of the sign of Leo (see Zodiac). The Tropic of Cancer is the name given to the northern tropic. See Tropics.

CANDLE. Candles are made by running tallow, wax, spermaceti or paraffin around a wick. There are two processes in candle making, dipping and molding, but the latter is the more common. In large manufactories, machinery is employed in molding as well as in dipping. *Wax candles* are seldom molded, on account of their adhesion to the molds and their contraction in cooling. A different method of manufacture, termed *basting,* is accordingly resorted to. Wax candles are still employed in the Catholic and Greek churches, as indispensable accessories of the altar. *Sperm candles* are composed of spermaceti mixed with beeswax. *Paraffin candle* manufacture is now carried on on a most extensive scale. Paraffin candles are much in demand on account of their cheapness and the clearness and brilliancy of their light. The Indians of Alaska make candles of a fish called the *candlefish* (which see).

CAN'DLEBERRY, WAX TREE, or **WAX MYRTLE,** a shrub growing from four to eighteen feet high, and common in North America, where candles are made from its small berries. These are covered with a greenish-white wax, popularly known as bayberry tallow. The wax is collected by boiling the berries in water and skimming the surface. A bushel of berries yields from four to five pounds of wax.

CANDLEFISH, a sea fish of the salmon family, of about the size of the smelt, frequenting the northwestern shores of America. It is converted by the Indians of Alaska into a candle, simply by passing the pith of a rush or a strip of the bark of the cypress tree through it as a wick, when its extreme oiliness keeps the wick blazing. The oil is sometimes extracted and used as a substitute for cod-liver oil. Though the fish is very oily its flesh has an agreeable flavor, and the oil itself is not unpleasant.

CAN'DLEMAS, a Church feast, instituted in 492 in commemoration of the presentation of Christ in the temple and of the purification of Mary. It falls on February 2, and on this day, among Roman Catholics, lighted candles are carried about in procession, and all candles and tapers which are to be used in the churches during the entire year are consecrated. The feast is retained by the Anglican Church and is also observed by the Lutherans.

CANDY AND CANDY MAKING. The term *candy* is applied to a wide variety of preparations having sugar as their chief ingredient. There are also added nuts, fruits, coloring matter, flavoring extracts, etc., and glucose is usually employed to give the proper consistency. It is an interesting fact that candy making developed from the old custom of using sugar and honey to conceal the disagreeable taste of medicines. Previous to the nineteenth century sugar-coated pills and other medicated candies were the only sweetmeats known, but candy making as an independent industry has now reached a position of great importance. In the United States alone, the output in average

years is valued at over $135,000,000. During the World War scarcity of sugar caused a decrease in the output, and a small measure of success was attained in the production of sugarless candy.

The question as to the harm which candy does to the health is an important one, because candy eating is a widespread habit. Physicians agree that pure candy eaten occasionally after a meal is not only harmless but wholesome, as a certain amount of sugar is good for the system. It is the indiscriminate and excessive use of candy which harms the digestion and leads to biliousness and similar ills. Children especially should be kept from immoderate candy eating, for it harms not only the stomach but the teeth. Children should never be permitted to buy cheap, highly colored confectionery.

Candy Making. The factory processes of making candy are very interesting. The sugar and glucose composition is boiled in water until the syrup is thick and almost clear. This syrup is then poured out upon huge marble slabs, where it is allowed to cool for a time. It is then worked by means of long iron paddles, much as a plasterer would stir mortar. Under this treatment it becomes hard, white and almost crystalline. This process is sometimes carried on in copper kettles, which not only cook the ingredients, but beat them white and hard by means of a rotating dasher. The candy is now ready to be cast into various sizes and shapes. Candy is cast in cornstarch molds. The starch is placed in narrow, shallow boxes and smoothed off at the top. The boxes are run under a press, the lower part of which is covered by projections of just the size required. When the press goes down, a little hammer taps the top of it automatically, and the cornstarch is punctured with rows of smooth, clear-cut holes. When the molds are complete, they are filled from a tank with cream candy. Marshmallows are cast in the same way. When the candy in the molds is dry and hard, the boxes are taken to a machine called the "starch-buck." Here the starch and candy are dumped into a hopper, under which is a series of sieves. The starch falls through the meshes, and the candy is carried on through a series of brushes to take off the remaining starch.

Chocolate creams are dipped by means of a little wire spoon, after which they are placed on a piece of oilcloth and set in a frame to dry. For the manufacture of lozenges and candy hearts, the sugar is mixed cold in large tubs, and the lozenges are pressed out in molds. Mottoes are printed on the hearts with a rubber stamp. For cocoanut candy, the nuts are bought whole, and the hard, white meat is taken out and placed in a kettle, where it is boiled and violently stirred at the same time, by means of rotating dashers. Sugar is added, and when the mass is sufficiently cooked it is placed on a marble slab and rolled down even with a long, cylindrical roller. Cocoanut is colored and molded into various forms and is sliced up in strips with a patent cutting machine. Caramels are made of sugar and pure cream, carefully boiled together until the product is of proper consistency, and then poured on marble slabs to cool. They are then cut and wrapped.

Hard candy is made of sugar boiled over an open fire and then colored in various shades. The batches are mixed and rolled out by hand until they are the size of an ordinary stick of candy, after which they are cut up into the regular lengths. Rock candy and many of the sugared nuts are made by crystallizing sugar. A tin box, in which numerous strings run from top to bottom, is filled with sugar and set away in a warm place. The crystals of sugar form on the strings and harden there, thus making the well-known rock candy. In the same way crystals are allowed to form on almonds and other nuts and fruit.

CAN'DYTUFT, a group of plants related to the mustard, three species of which are common in gardens. *Purple candytuft* is so called from its purplish flowers, which are borne in flat-topped clusters. There are four petals to a blossom. Like other members of the group, purple candytuft has petals of irregular formation, as the two inner are shorter than the outer ones. *Bitter candytuft* is notable for the medicinal properties of its root, stem, leaves and seeds. Its profuse growth of pure white flowers is the distinctive characteristic of the *evergreen candytuft,* a native of warm regions. The name of this plant group is derived from *Candia,* the old English name for the island of Crete. It was from this island that candytuft seeds were introduced into England.

CANE, a term sometimes loosely applied to any small and smooth rod, of the thickness of a walking stick or less; but more correctly

limited to the stems of the smaller palms and the larger grasses, used so extensively in making walking sticks, or *canes*. This is an example of the name of the material being applied to the thing made, as in the case of *cork*. Sugar cane and bamboo are examples of cane plants, and so, too, is rattan. To the rattan group belong the canes largely imported from the tropical regions of the East, for making bottoms of chairs and couches.

CANEL'LA, WHITE, a tree belonging to the West Indies, growing to a height of ten to fifty feet, with a straight stem, branched only at the top. It is covered with a whitish bark, which is freed from its outward covering, dried in the shade and brought to Europe in long quills, somewhat thicker than those of cinnamon. Canello bark has a pungent, acrid taste and is esteemed as a pleasing and aromatic bitter.

CANIS MAJOR, *ka'nis ma'jer*, a constellation of the southern hemisphere, remarkable because it contains Sirius, or the Dog Star, the brightest of all stars. The name is Latin, and means *greater dog*.

CANKER, *kang'ker*, a painful sore which generally forms in the mouth, especially on the tongue. Ulcers are an indication of a disordered stomach, and are common ailments of children. Pulverized alum or silver nitrate is an effective remedy, but the former is preferable, as it is less irritating.

CANKERWORM, the destructive caterpillar (larva) of certain moths, very common in Northeastern United States and Canada. Cankerworms attack apple and pear trees, especially, though other trees suffer when the insects are numerous. The larvae appear at about the same time as the leaves, and they are voracious feeders. When disturbed they drop from the leaves and hang suspended on silk threads. If they reach the ground they must climb the trunk to resume their feeding. The female is compelled to climb the trunk in order to lay her eggs, and accordingly the defense against cankerworms is to surround the trees in spring time by bands of tarred paper, over which the insects cannot crawl. Paris green can be used safely on shade trees, but not on fruit trees.

CANNAE, *kan'nee*, ITALY, a town in the province of Bari, near the mouth of the Ofanto, formerly the Aufidus River. The place is of historical importance, because it was the scene of the battle in which the Roman army sustained a terrible defeat by Hannibal in 216 B. C. The Romans numbered 80,000 infantry and 6,000 cavalry, whereas Hannibal's army consisted of 10,000 cavalry, but only about 40,000 infantry. Of the Romans 70,000 fell, including the consul Lucius Paulus and eighty men of senatorial rank. Hannibal lost not quite 6,000.

CANNIBAL, *kan'i bal*, a person who eats human flesh. The Spanish discoverers found that the practice of eating human flesh existed among the Caribs, a West Indian tribe now extinct, and the word came from their name. Since that time it has been found that the practice has existed among ignorant and barbarous tribes in all parts of the world, and it is probably not wholly extinct in remote sections of the East Indies.

In some instances cannibalism seems to have been of the nature of a religious rite, the victims being first sacrificed to a god and later eaten; but in many other cases the practice appears to have been rather the natural result of ferocity or to have originated in a natural demand for flesh. Early North American Indians sometimes ate the bodies of prisoners of war, and the Aztecs of Mexico consumed human bodies used as offerings to the war god. Even civilized men of to-day, in the extremity of hunger, may be driven to eat human flesh. In stories of shipwrecks and sieges such practices are reported.

CAN'NING, a process of preserving fruits, vegetables and meats, by enclosing them in air-tight cans. This process was discovered in 1795 by a Frenchman named Nicholas Appert, and it was introduced into the United States about 1815, though as an industry canning was not developed until some time after that date. The principle underlying canning is that the germ which causes fermentation must be killed or driven off from the articles in order to preserve them. Since heating always kills this germ, the articles are cooked either before or after being placed in the can.

Methods. Of four methods of canning now generally practiced, the *hot-pack* or *open-kettle* method is perhaps most common in the home. The food is boiled or sterilized in one kettle, and the jars, with caps and rubbers, in another. After the food is poured into the jars they are sealed. This

method does not, however, ensure perfect protection against the entrance of germs.

A more satisfactory process is the *three-day* or *fractional* method. This consists in boiling the food for three days, to destroy organisms that develop after the process has begun. The objections to it are the quantity of fuel needed, the amount of work involved and the waste of rubbers, which are destroyed by repeated boilings.

Gooseberries and other fruits containing a good deal of acid are sometimes packed into jars, and the jars then filled to overflowing with cold, sterilized water. This, the *cold-water* method, is not of great practicable value for it cannot be depended upon to succeed.

A successful and economical process used both by commercial and home canners is the so-called *cold-pack* method.

A serviceable cold-pack home canning outfit may be made of materials found in any household. All that is necessary is a vessel to hold the jars or cans—such as a wash boiler or a large tin pail. This vessel should have a tight-fitting cover. Provide a false bottom of wood or a wire rack to allow for free circulation of water under the containers. The wood bottom may be of perforated boards or of laths nailed to three cross-pieces. If the boiler is deep enough to accommodate two tiers of containers, place a rack on the tops of the lower row to support the top tier.

The cold-pack method of canning is so simple and the directions so easily followed that the average twelve-year-old girl may successfully can vegetables or fruits with it. The steps to be taken and the precautions which should be observed are as follows:

1. Select sound vegetables and fruits. (If possible can them the same day they are picked.) Wash, clean and prepare them.

2. Have ready on the stove, a can or pail of boiling water.

3. Place the vegetables or fruits in cheesecloth, or in some other porous receptacle—a wire basket is excellent—for dipping and blanching them in the boiling water.

4. Put them whole into the boiling water. After the water begins to boil begin to count the blanching time.

5. The blanching time varies from one to twenty minutes according to the vegetable or fruit. When the blanching is complete remove the vegetables or fruits from the boiling water and plunge them a number of times into cold water, to harden the pulp and check the flow of coloring matter. Do not allow to stand in cold water.

6. The containers should be thoroughly clean. It is not necessary to sterilize them in steam or boiling water before filling them, for the reason that in the cold-pack process both the insides of containers and the contents are sterilized. The jars should be heated before being filled in order to avoid breakage.

7. Pack the product into the containers, leaving about a quarter of an inch of space at the top.

8. With vegetables add one level teaspoonful of salt to each quart container and fill with boiling water. With fruits use syrups.

9. With glass jars always use a new rubber. Test the rubber by stretching or turning inside out. Fit on the rubber and put the lid in place. If the container has a screw top do not screw up as hard as possible, but use only the thumb and little finger in tightening it. This makes it possible for steam generated within to escape and prevents breakage. If a glass top jar is used, snap the top bail only, leaving the lower bail loose during sterilization.

10. Place the filled and capped containers on the rack in the sterilizer. If the home-made or commercial hot-water bath outfit is used, enough water should be in the boiler to come at least one inch above the tops of the containers, and the water, in boiling out, should never be allowed to drop to the level of these tops.

11. At the end of the sterilizing period remove the containers from the sterilizer. Fasten covers on tightly at once, turn containers upside down to test for leakage, leave in this position until cold, and then store in cool, dry place. Be sure that no draft is allowed to blow on glass jars as it may cause breakage.

12. If jars are to be stored where there is strong light wrap them in paper, preferably brown, as light will fade the color of products canned in glass jars, and sometimes deteriorate the food value.

Some Canning Facts. The preservation of foods by means of canning is one of the ways in which the problem of food distribution is solved. In a country like the United States, for example, perishable foods cannot be shipped to some districts without serious loss. Even with the present development of cold storage facilities, the canning of foods—vegetables, fruits, fish and meat—is the best solution of getting supplies to large numbers of people at a reasonable cost. Before America entered the World War over 300,000,000 cans of food were being annually put up in commercial canneries, and the amount thus preserved in home kitchens represented an estimated total of 150,000,000 quarts. After the inauguration

of the food conservation campaign these figures were materially increased. See CANNING CLUBS.

In 1917 the National Emergency Food Garden Commission, Washington, D. C., issued a series of pamphlets on the subject of home canning. In this literature are detailed instructions relative to methods, together with explanatory pictures. Copies of pamphlets may be obtained on request. Two cents for postage should be enclosed.

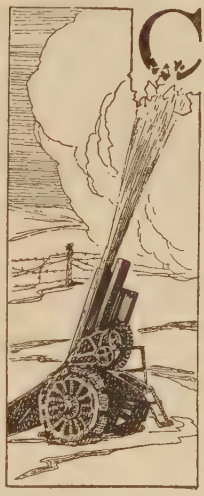
The United States government issues the following pamphlets on this subject: Farmers' Bulletin 839, Home Canning by the One-Period Cold-Pack Method; Farmers' Bulletin 841, Home and Community Drying of Fruits and Vegetables; Farmers' Bulletin 853, Home Canning of Fruits and Vegetables.

CANNING CLUBS. Of the many activities of the United States Department of Agriculture, none is producing more satisfactory results than the canning-club movement. The work is carried on in connection with school club projects (see BOYS' AND GIRLS' CLUBS), and it has also become a specialized home activity. The latter phase of the movement concerns itself with the organization of "mother-daughter" canning clubs. By means of these home clubs mothers and daughters learn to coöperate with each other in the economic and social life of the household; they work together in reducing living expenses and in making the family diet more attractive. The daughters learn lessons of thrift, economy and industry which are of highest value, and the whole community is benefited by the new spirit of coöperation between different families and groups.

As worked out by the Department of Agriculture, the plan for a mother-daughter home canning club contemplates work covering four years. Canning takes up the greater portion of the first year, and includes not only actual canning of fruits and vegetables, but attendance at demonstrations and study of prepared bulletins and pamphlets. Regular club meetings and an exhibition of work accomplished are other features. The work of the next three years is simply a development and continuation of the first year's activities, with additional instruction in the care and arrangement of the kitchen and in keeping records and accounts. The net result should be a general reorganization of home management along systematic lines.

Club meetings should be held at times most convenient for the majority of members in any community. Many localities find two afternoons a month quite sufficient. The typical program consists of a business session; a subject-matter program, devoted to reports, discussions of canning methods, etc.; and a special program, which may be quite varied. Current events, school problems, music, games, etc., could all be included to good advantage.

The special division of the Agricultural Department which supervises the canning-club movement is prepared to furnish full instructions as to membership, organization and methods. Letters of inquiry should be addressed to the state agent in charge of boys' and girls' club work, at the state college of agriculture, or to the States Relation Service, North and West, Department of Agriculture, Washington, D. C.



CANNON, a big gun, or piece of ordnance, mounted on wheels and drawn by horses or motor truck, or mounted on specially-built railroad cars. The various types of cannon are the most destructive of all modern weapons of warfare except the machine gun (which see). The present-day term that is employed in referring to cannon is *artillery;* the older word is seldom heard. General information as to the size and power of great guns will be found under the title ARTILLERY.

Process of Manufacture. The steel in great guns must resist a pressure of at least twenty tons to every square inch of surface. Manufacture has been brought to this degree of perfection through constant effort, made necessary by competition among nations to produce the most destructive weapons of war. A few years ago hardened steel met all requirements, but to-day were such metal used in the great guns, the pressure would be too great to withstand. Carbon steel is now used, with sometimes a small proportion of nickel added to it.

In the process of manufacture the open hearth method (see STEEL) is employed in producing the molten steel. After the molten steel has cooled, it is then reheated and passed to a hydraulic press and forged to the required shape of the gun. Formerly a steam hammer did this forging, but now hydraulic pressure as great as 10,000 tons is used. When forging is complete, the gun

is heated again and annealed, after being allowed to cool by being placed in warm sand. Hardening continues still further by heating the metal to 1,600° F. and immersing it quickly into an oil bath.

The forging is then placed on a lathe and the barrel is bored to the required size. The process above described refers only to the tube of the gun; it must now be fitted to the outside covering, or jacket, which gives it the strength to resist tremendous pressure from inside when the gun is fired. The outer tube is forged about one-tenth inch larger than the circumference of the inner tube, so it will fit over it. The jacket is put in place when heated and on cooling it contracts so closely over the tube as practically to become a part of it. Even after this it is further strengthened by having a number of extra bands shrunk on to it by the same process.

The breech of the cannon is an improved piece of mechanism which must move swiftly and smoothly into its place and yet be strong enough to bear the terrific recoil of the discharge. Various forms of mechanism are in use, but most of the cannon are fitted with what is called the interrupted screw. In the latest modification of this, the breech block is divided into twelve or more longitudinal sections, every fourth one of which is blank, while the others have screw threads and vary in diameter. One-twelfth of a turn of the breech block will engage three-fourths of its surface into the breach.

Historical Development. The precise period at which engines for projecting missiles by mechanical force (see CATAPULT) were supplanted by those utilizing explosive materials is a matter of controversy, the invention of cannon being even attributed to the Chinese, from whom the Saracens may have acquired the knowledge. They were brought into use in France as early as 1338. At first they were made of wood, well secured by iron hoops, the earliest being somewhat conical, with wide muzzles, and the later, cylindrical. They were then made of iron bars firmly bound together with iron hoops like casks. Bronze was used in the second half of the fourteenth century, toward the close of which cast-iron ordnance came into use. A form of breech-loading cannon was introduced in the sixteenth century.

Cannon were formerly dignified with great names. Twelve cast by Louis XII were called after the twelve peers of France, and Charles V had twelve called after the twelve apostles. Later they were named from the weight of the balls which they carried—6-pounders, 12-pounders; but they are now usually designated by their caliber or diameter of bore. Thus a gun with a bore 6 inches in diameter is called a 6-inch gun; with a bore of 8 inches, an 8-inch gun, etc.

Great improvements and changes in the manufacture of cannon have been introduced in recent times. Not long ago they were all made of iron, brass or gun metal (a variety of bronze), by casting. The introduction of rifled small arms led the way to that of rifled cannon and the adoption of heavy armor for ships of war rendered guns of enormous power and magnitude necessary in order to penetrate their sides. The increased inertia of the projectiles and their rapid rotation in these rifled guns tried the piece so severely that cast iron and bronze were discarded in favor of steel. See ARTILLERY; HOWITZER; MORTAR.

CANNON, JOSEPH GURNEY (1836–), one of the most famous and almost the last of a generation of American legislators whose personality dominated public life in large measure. Cannon was born at Guilford, N. C., but moved to Illinois when a young man, locating at Danville. He was admitted to the bar in the latter state, and was state's attorney for Vermilion County (1861–1868). From 1873 to 1891 and from 1893 to 1913 he served as a Republican in the House of Representatives. During this period in Congress he was for eight years chairman of the appropriations committee; from 1903 to 1911 he was Speaker of the House, being defeated in the latter year for this honor because the House became Democratic, and Champ Clark succeeded him in the Speaker's chair. In 1912 he was defeated for reëlection and for the 1913-1915 session of Congress he was a private citizen—the second two-year period of absence from Congress in forty years. In 1914 he was elected again, taking his seat in the first session of the Sixty-fourth Congress in 1915, and was

JOSEPH G. CANNON

again honored in 1916 and in 1918. Cannon aspired to be President of the United States, and in the national Republican Convention of 1908 he received Illinois' complimentary vote on the first ballot.

At home he is called "Uncle Joe Cannon," and the nation became familiar with the term, for it followed him throughout most of his public career. He was a friend of Lincoln and in his later years has looked much like the martyred President. He was made chairman of the Lincoln Memorial Commission in 1914.

CANOE, *ka noo′,* and **CANOEING,** *ka noo′ing.* A canoe is a light boat, narrow in the beam and propelled by paddles, sometimes in conjunction with sails. The name was originally given to the boats of uncivilized races, but its application has been considerably extended, and canoes of home make may be seen on the waters of most civilized countries. They are of the most diverse materials and construction. The simplest ones were hollowed out of a single log and were known as *dugouts.* The Indian canoes of Canada are of birch bark and covering a wooden frame. The Eskimo *kaiak* consists of a light wooden frame covered with seal skins sewed together with sinews, and having only one opening to admit the boatman to his seat. In the islands of the Pacific the

CANOES

natives have double canoes, united by a strong platform and serving in this way as one vessel. The ordinary canoe used in recreation weighs from forty to sixty pounds and costs from $25 to $100, or more. Typical forms are shown in the accompanying picture.

Canoeing is a delightful pastime wherever there are lakes, rivers and forests. The boat draws little water and under skilful management can be taken successfully through rapids and can be sent with great speed over the still water. Every summer many people leave the cities on camping excursions and with their canoes are able to explore many delightful places that otherwise would be entirely inaccessible.

One of the first things to learn in canoeing is the proper way to get in and out of the boat, for the peculiar shape of a canoe makes it easily upset. It is dangerous, for example, to throw a heavy weight suddenly on the side of a canoe, and so it is safest to climb in at the bow or stern. When the canoe is entered at the side the step should be taken in such a way that the feet land directly in the bottom of the canoe, not near the edge. One or two persons may propel the canoe, but if there are two the stern paddle should be on the right side when the bow paddle is on the left. A single paddle may be wielded from either side, but the paddler sits preferably at the stern.

CANONIZATION, *kan un i za′shun,* a Roman Catholic ceremony by which the honor of sainthood is bestowed on certain qualified persons. A candidate to be successful must have performed at least two miracles. The first step is a strict inquiry into the character of the candidate and the authenticity of the miracles accredited to him. Then comes the announcement of beatification; after several years have elapsed, during which the fitness of the candidate has been proven, he is declared a saint and a day is set aside for the celebration of his memory. The power to investigate the life of the prospective saint and to announce his beatification and canonization is vested in the Pope.

CANON, *kan′un,* **LAW,** a term used in the Roman Catholic Church to signify the body of law which regulates Church doctrines and policies. The canon law is made up of epistles and bulls of Popes, decrees of ecclesiastical councils, certain civil law sayings, Bible teachings and utterances of the Church fathers.

CANOVA, *ka no′va,* Antonio (1757–1822), an Italian artist, one of the most prominent figures of modern times in the field of sculpture. At the Academy of Venice he had a brilliant career, and in 1779 he was sent by the senate of Venice to Rome, where he produced his *Theseus Vanquishing the Minotaur.* In 1783 Canova undertook the execution of the tomb of Pope Clement XIV in the Church of the Apostles, a work inferior to his second and perhaps his best

public monument, the tomb of Pope Clement XIII in Saint Peter's. *Psyche and Butterfly, Hebe,* the colossal *Hercules Hurling Lichas into the Sea,* the *Pugilists* and the group of *Cupid and Psyche* are among his more noted works. In 1796 and 1797 Canova finished the model of the celebrated tomb of the Archduchess Christina of Austria and made the colossal model of a statue of the king of Naples. He afterward executed in Rome his *Perseus with the Head of Medusa,* which, when the *Belvedere Apollo* was carried to France, was thought not unworthy of its place and pedestal. In 1802 he was invited by Bonaparte to Paris to make the model of his colossal statue.

CANTA'BRIAN MOUNTAINS, the general name given to the various mountain ranges extending from the western Pyrenees along the north coast of Spain to Cape Finisterre. Their length is slightly over 300 miles, and in elevation they vary from 3,000 to 8,800 feet. The highest peaks are near the center of the range. They present numerous bold promontories and headlands along the coast.

CANTALOUPE, *kan'ta loop.* See MUSKMELON.

CANTATA, *kan tah'ta,* a class of musical compositions in which a story is told by the singers. The score is divided into choruses, solos, duets, trios and quartets. The cantata is shorter than either oratorio or opera, and when written upon a sacred theme, differs from the former in being less symbolical; when written upon a secular theme, it differs from opera in its lack of scenic accessories. Typical cantatas are Dudley Buck's *The Golden Legend* and *Light of Asia. The Rose Maiden* and *Queen Esther* are other melodious and popular cantatas. See ORATORIO; OPERA.

CANTERBURY, *kan'ter ber i,* ENGLAND, a city in Kent, famous as the seat of Canterbury Cathedral and as the religious center of the country. Here, too, are the shrine of Thomas à Becket and the tomb of Edward the Black Prince. Canterbury lies fifty-five miles southeast of London. It dates from the Roman period and has numerous relics and a number of fine schools, including a grammar school founded by Henry VIII. A delightful picture of this interesting old town is given by Charles Dickens in the great novel *David Copperfield.* Population, 1917, about 25,000.

CANTERBURY TALES, the masterpiece of Geoffrey Chaucer, the most famous English poet of the fourteenth century. The title refers to the plan of the poem, which was to consist of the stories told by a group of persons while on a pilgrimage to the shrine of Thomas à Becket, at Canterbury. The author planned to have each of the characters relate two tales, but he died before he completed the work. Even in its unfinished state it is an enduring monument of his poetical genius. To-day most readers are familiar only with the *Prologue,* which describes the men and women of the company, with delightful touches of humor and sure insight into human character. Inexpensive editions of this charming work, with glossary and notes to assist the reader, may be obtained at any standard book store.

CANTON, *kan ton',* CHINA, one of the largest cities of the country, and a commercial center of first rank. It is situated in Southeastern China, on the east bank of the Pearl River, between seventy and eighty miles from the sea. Canton is the capital of the province of Kwang-tung. It consists of two parts—the ancient walled city, six miles in circumference, and the suburbs, extending along the river on both banks. Thousands of persons also live in house boats on the river. Unlike most Oriental cities, Canton is a fairly clean municipality. An inner wall divides the city proper into two sections, called *old* and *new.* The former has narrow streets and low houses, and there are innumerable shops containing every conceivable form of merchandise. Here, too, are the pagodas, mosques and temples of a typical Chinese city. In the newer part, however, one sees churches, libraries, schools and business houses in Western style of architecture. The foreign mercantile houses and the British, French and American consulates have as their special quarter an area in the suburbs southwest of the city, with water on two sides of it.

The industries of Canton are varied and important, embracing the manufacture of silks, cotton goods, porcelain, glass, paper, sugar, lacquered ware, firecrackers and metal goods. Though the natives were long opposed to the entrance of foreigners, since 1861 the city has been open to outside trade and residence. The greater part of the shipping, amounting to 5,000,000 tons a year,

is under the British flag. Population, about 900,000.

CANTON, Ill., founded in 1832 and incorporated in 1849, is a city in Madison County, on the Chicago, Burlington & Quincy and the Toledo, Peoria & Western railroads, about thirty miles west of Peoria. There are coal-mining interests, agricultural implement works and other local manufactures of a general nature. There is a public library and one hospital. Population, 1910, 10,453; in 1917, 13,674 (Federal estimate).

CANTON, Ohio, founded in 1805, is the county seat of Stark County, on the Pennsylvania, the Baltimore & Ohio and the Wheeling & Lake Erie railroads, sixty miles southeast of Cleveland and 101 miles northwest of Pittsburgh. The total output of the city's manufacturing interests is valued at a million dollars a week. There is one of the largest sheet metal works in the United States; bearings, castings, enameled ware, plows and brick are made, and one of the most expensive and best-known watches in the world is made here. Canton has a great auditorium which occupies an entire block and seats 4,200 people, a Carnegie Library and three hospitals. The city was for many years the home of former President William McKinley; his old home and a monument to his memory are of national interest. Population, 1910, 50,217; in 1917, 62,566 (Federal estimate).

CAN'TONMENT, a camp or district in which soldiers are quartered. The term refers specifically in India to a military town containing barracks, houses for officers, huts for native troops, parade grounds, administration buildings, etc.

In the United States, after the nation entered the World War, thirty-six cantonments for the troops of the new army in the making were built in the various military districts of the country. These contained barracks for quartering the soldiers and all necessary facilities for their training. Following is a list of the cantonments; the list does not include thirteen camps used solely for the training of officers, or fourteen aviation fields:

CAMPS	LOCATION
Bowie	Fort Worth, Texas
Beauregard	Alexandria, Louisiana
Custer	Battle Creek, Michigan
Cody	Deming, New Mexico
Doniphan	Fort Sill, Oklahoma
Devens	Ayer, Massachusetts
Dix	Wrightstown, New Jersey
Dodge	Des Moines, Iowa
El Paso	El Paso, Texas
Eustis	Fort Monroe, Va.
Fremont	Palo Alto, California
Funston	Fort Riley, Kansas
Greene	Charlotte, North Carolina
Gordon	Atlanta, Georgia
Grant	Rockford, Illinois
Hancock	Augusta, Georgia
Jackson	Columbia, South Carolina
Johnson	(Quartermaster Training Camp, Jacksonville, Florida)
Kearney	San Diego, Cal.
Logan	Houston, Texas
Lee	Petersburg, Virginia
Lewis	American Lake, Washington
McClellan	Anniston, Alabama
Meade	Admiral, Maryland
Merritt	Tenafly, New Jersey
Pike	Little Rock, Arkansas
Sevier	Greenville, South Carolina
Sheridan	Montgomery, Alabama
Shelby	Hattiesburg, Mississippi
Sherman	Chillicothe, Ohio
Stuart	Newport News, Virginia
Taylor	Louisville, Kentucky
Travis	San Antonio, Texas
Upton	Yaphank, Long Island, New York
Wadsworth	Spartanburg, South Carolina
Wheeler	Macon, Georgia

Nearly all of the cantonments were abandoned during the year 1919.

CANUTE, *ka nute'*, (about 994–1035), king of England, Denmark and Norway. He became king of England on the death of his father, Sweyn, in 1014, and confirmed the Danish power in England. He began by devasting the eastern coast and extended his ravages in the south, where, however, he failed to establish himself until after the assassination of Edmund Ironside, when he was accepted king of the whole of England (1017). Canute, who began his reign with barbarity and crime, afterward became a humane and wise monarch. He restored the English customs at a general assembly, guaranteed the Danes and English equal rights and equal protection of person and property, and even advanced English subjects to the most important posts. At the death of his brother in 1018 he gained Denmark; in 1028 he conquered Norway, and in 1031 he compelled Malcolm of Scotland to acknowledge his superiority.

CANVAS, a strong, coarse cloth made of cotton or flax, and extensively used for sails, tents and awnings. The canvas used for the sails of large vessels is made of flax and is called sailcloth. A lighter and thinner variety, called duck, and made of linen or cotton, is used for small sails. Duck of finer

quality is a favorite material for men's and women's summer outing costumes. The canvas used by artists for oil paintings is usually of linen.

CANVASBACK, a sea duck living in the inland waters of North America, where it feeds upon the roots of the wild celery. It is a large bird, and, as it is considered the finest of water fowl for the table, it has been hunted almost to extinction. Game laws of recent date are now serving to protect it. The plumage is black, white, chestnut-brown and slate color. As the canvasback has a reddish head, it is often confused with the redhead, a duck that is often substituted for it in the markets.

CANYON, or **CANON**, *kan'yun,* a term applied in North America to long and narrow river gorges or deep ravines with precipitous and almost perpendicular sides. Canyons are numerous in the Rocky and Sierra Nevada mountains, and some of them, particularly the canyons of the Yellowstone and Yosemite Valley and the Grand Canyon of the Colorado, are numbered with the world's greatest scenic wonders. See GRAND CANYON OF THE COLORADO RIVER; ROYAL GORGE; YELLOWSTONE NATIONAL PARK.

CAP, a covering for the head. It differs from a hat in having no brim. Caps made of worsted, fur or some other soft material, with or without a visor, are worn by men and in some countries by women. Among the ancient Greeks and Romans, caps were worn as a sign of freedom; hence, the cap became in all nations a symbol of liberty. A cap made of lace and silk or muslin was formerly a fashionable style of head-dress for women, but is now not much worn except by servants.

CAPE ANN, a promontory off the northeast coast of Massachusetts, thirty-one miles northeast of Boston. On this cape are the towns of Gloucester, Rockport and Pigeon Cove. There are valuable stone quarries here. On the south and east coasts there are many attractive summer resorts.

CAPE BARROW, the most northerly point of Alaska. A whaling station is located here.

CAPE BLANCO, *blahN'ko,* a name given to several capes. 1. A cape off the west coast of Africa, on the Atlantic. 2. The most northerly point of Africa, on the northern coast of Tunis. 3. A cape on the west coast of Morocco. 4. The most westerly point of Oregon, in the United States, on the Pacific coast. A powerful lighthouse is located here.

CAPE BRETON, *bret'un,* or *brit'un,* a rocky island belonging to the Canadian province of Nova Scotia, from which it is separated by the Strait of Canso. The island has large areas of picturesque forest land, and its coal mines are among the most valuable in all Canada. About 7,000 men are engaged in the fishing industry, for the surrounding waters abound in cod, mackerel, herring and whitefish. Cape Breton island has a population of over 122,000, but nearly all of the foodstuffs for the maintenance of the people are transported from the mainland, as the soil is not adapted to agriculture. The island is 3,120 square miles in area, and is divided into four counties, Cape Breton, Inverness, Richmond and Victoria. The chief towns are Sydney, Dominion, Sydney Mines, North Sydney, Glace Bay and Inverness. Originally a French possession, Cape Breton passed into permanent control of the English in 1763, at the close of the French and Indian wars.

CAPE CHARLES, a cape at the southern extremity of Northampton County, Virginia, at the entrance of Chesapeake Bay. It is twenty-five miles north-northeast of Norfolk. A lighthouse with a flashing white light has been erected on Smith Island, off Cape Charles.

CAPE CLEAR, a promontory 400 feet high at the southern extremity of Clear Island, the most southern point of Ireland, about seven and a half miles southeast of Baltimore, County Cork. Clear Island is about three and a quarter miles long and about a mile broad. It has a lighthouse whose revolving light is 455 feet above the sea.

CAPE COD, a peninsula sixty-five miles long and from one to twenty miles broad, on the south side of Massachusetts Bay, forming Barnstable County in the state of Massachusetts. It is mostly sandy and barren, but some portions are fertile and produce a large yield of cranberries, the cultivation of which is the leading agricultural industry. Other portions are well wooded. Provincetown, on the northern extremity of the peninsula, has an excellent harbor and is one of the most important fishing ports on the Massachusetts coast. See CAPE COD CANAL.

CAPE COD CANAL, a waterway constructed across a strip of land uniting Cape Cod and the mainland of Massachusetts. As it was excavated in land nearly at ocean level no locks had to be constructed. From shore to shore the canal is eight miles long, but the channel has a length of thirteen miles, terminating in thirty-foot depths in Buzzard's and Barnstable bays. The depth of the main course of the canal at average low tide is twenty-five feet. The approaches in the bays are from 250 to 300 feet wide at the bottom, but the bottom width of the channel in most parts is 100 feet. This width is increased at certain points where boats pass each other. Electric lighting, a long breakwater with a lighthouse, and modern bridges are features of this fine waterway, the operating cost of which is met by toll payments.

Cape Cod Canal was opened to navigation in 1914, under the ownership of the Boston, Cape Cod & New York Canal Company. The enterprise was financed by August Belmont. In July, 1918, President Wilson by proclamation assumed government control of the canal and directed the railroad administration to operate it. It was announced that water-borne coal destined for New England would be moved through the canal, and that much of the shipping plying in and out of Boston would be routed through it. From its completion the waterway has been of great value to coastwise shipping, because it has eliminated the dangerous trip around Cape Cod by way of Nantucket Sound. The frequency of fogs and the prevalence of shoals in the sound had formerly caused numerous wrecks and the loss of many lives. By taking the inside route ships save seventy miles and are assured of protection from storms and submarine attacks.

In 1919 Congress discussed the purchase of the canal by the government at a cost not to exceed $10,000,000.

CAPE COLONY. See CAPE OF GOOD HOPE, PROVINCE OF.

CAPE COM'ORIN, the southernmost extremity of the peninsula of India. A short distance from the cape are the remains of the once famous town of Cape Comorin, consisting of a fort, village, church and some ancient temples.

CAPE FEAR, a cape at the southern extremity of North Carolina, extending from Smith Island into the Atlantic Ocean. Navigation is extremely dangerous around this point, and from this fact the name possibly was derived.

CAPE FLATTERY, a cape in the state of Washington, bounded on the northeast by the Straight of Juan de Fuca and on the southwest by the Pacific Ocean. It is the farthest point west in continental United States.

CAPE GIRARDEAU, *ji rahr'doh*, Mo., founded in 1806, and named for the French commander Girardot, who held a military post here in 1765, is a city in Cape Girardeau County. It is on the Mississippi River and the Cape Girardeau Northern Railroad and the Frisco Lines. There is also packet service on the river. The city is one of the educational centers of the state; here are a state normal school, with six large stone buildings, and Saint Vincent's College and Saint Vincent's Convent, two of the oldest schools west of the Mississippi River. There are twelve miles of paved streets. The city is eighth among Missouri's cities in manufactures. Population, 1910, 8,475; in 1917, 11,146 (Federal estimate).

CAPE HATTERAS, a cape on Hatteras Island, along the coast of North Carolina. It is the projecting point of a long reef of sand, which storms and shoals make dangerous to navigation. A lighthouse over 190 feet high has a light that flashes every ten seconds, and three quarters of a mile south there is another steady white light thirty-five feet above the sea.

CAPE HENLO'PEN, a cape on the east coast of Delaware, at the entrance of Delaware Bay. This cape is thirteen miles southwest of Cape May.

CAPE HEN'RY, a cape on the coast of Virginia, at the entrance of Chesapeake Bay, not far from Cape Charles. There are here a life-saving station and a lighthouse.

CAPE HORN, or **CAPE HOORN**, the southern extremity of an island of the same name, forming the most southerly point of South America. It is a dark, precipitous headland, 500 to 600 feet high, running far into the sea. Navigation round it is dangerous on account of frequent tempests, and vessels usually steer a course far from the cape. The cape was first doubled in 1616 by Schouten, a native of Hoorn, in Holland, whence its name.

CAPE LOOKOUT, a point of land on the east coast of North Carolina, about eighty-five miles southwest of Cape Hatteras.

CAPE MAY, N. J., one of the oldest summer resorts on the Atlantic coast, is the most southeasterly of the cities of the state, in Cape May County, about eighty miles south of Philadelphia. It is on the Philadelphia & Reading and the Pennsylvania railroads. There is a fine beach and ocean drive, and a boardwalk five miles long. There is a considerable fishing industry, principally in oysters, and the canning industry is important. Population, 1910, 2,471 permanent residents. Many thousands contribute to the summer population.

CAPE OF GOOD HOPE, a promontory near the southern extremity of Africa, at the termination of a small peninsula extending south from Table Mountain, which overlooks Cape Town. This peninsula forms the west side of False Bay, and on its inner coast are Simon's Bay and Simon's Town, where there is a British naval station. Bartholomew Dias, a Portuguese, who discovered the cape in 1487, called it Cape of Tempests, but John II of Portugal changed this to its present designation. It was first doubled by Vasco da Gama in 1497.

CAPE OF GOOD HOPE, PROVINCE OF, the chief province of the Union of South Africa, known as CAPE COLONY before 1910. It occupies the southern extremity of Africa and extends northward to the twenty-fifth parallel of south latitude. It is bounded on the north by what was German Southwest Africa, Bechuanaland, Orange Free State and Natal, the Orange River forming the dividing line along part of the northern boundary. The area is estimated at about 277,000 square miles, or a little less than the combined areas of Texas, Massachusetts and New Jersey. Population, 1911, 2,563,024.

In the southern portion of the province and along the coast the surface is mountainous and consists of rugged ranges, which rise in a series of successive elevations and enclose lofty plateaus and plains. These ranges run nearly parallel to the coast and attain their greatest elevation inland. The highest points in the northern portion are in the Drakenberg range, on the border of Natal. Table Mountain, rising directly above Cape Town, has an elevation of 3,550 feet. Compass Mountain, in the Snow Mountains in the south central portion, is the highest point and has an elevation of 8,500 feet. The northwestern region is less mountainous. The eastern coast is very regular, but the southern and western coasts have indentations which form good harbors. The Orange River, which forms part of the northern boundary, receives a number of small tributaries.

The climate is temperate in the south and semi-tropical in the north. The temperature is quite even and mild. Except along the coast in the southeast district, the rainfall is light, and the entire region is considered remarkably healthful.

The province is rich in minerals. Coal is found and worked in a number of localities. There are also deposits of copper, gold, silver and other metals, but the most important mineral is the diamond, which is found in very large quantities in Griqualand West, near Kimberley. For a number of years the annual yield of these diamond mines has exceeded $25,000,000 in value (see DIAMOND; KIMBERLEY).

More than $500,000,000 (mine value) of diamonds have been taken out in less than fifty years, making it the greatest diamond-producing section of the world.

A lack of rainfall prevents the fullest development of agriculture. All of the region is remarkably well adapted to grazing, and large numbers of cattle, horses, sheep and, especially, Angora goats are raised. Wherever the rainfall will admit, the land is tilled and good crops of wheat, Indian corn and other grains are raised. Vegetables and fruits thrive remarkably well in regions having sufficient rainfall, and grapes are also raised and wine is made. Fruits and vegetables are frequently shipped to European countries. Ostrich farming is profitable, and over 700,000 birds are kept for their feathers (see OSTRICH). The manufactures are confined to local industries.

There are over 3,900 miles of railway connecting the important towns. Cape Town is the southern terminus of the Cape-to-Cairo Railway. Nearly all of the railroads are operated by the government, as are the telegraph lines. The commerce of the province is large. The exports consist of wool and mohair, hides and tallow, ostrich feathers, vegetables, fruits and diamonds, while the imports are nearly all of manufactured products and such food stuffs as are not readily produced in the country. The most of the foreign trade is with the United Kingdom.

The inhabitants consist of English, Dutch and natives, which are divided among the Hottentots, Kaffirs, Basutos and Griquas.

There are also a number of Malays and, mingled with these, quite an extensive mixed race resulting from intermarriages. By far the larger part of the white population is of Dutch and English descent.

Government and History. The province of the Cape of Good Hope is governed, like the other British provinces in South Africa, by an administrator, appointed by the Governor-General for five years. The legislative department consists of a council of fifty-one members, elected for terms of three years. An executive committee of four members, who need not be members of the council, forms a sort of cabinet. All ordinances passed by the council are subject to veto by the Governor-General. At the head of the educational system is the provincial university, which is only an organization for the purpose of conducting examinations and granting diplomas and degrees. There are also a number of colleges. The important cities are Cape Town, Port Elizabeth and Kimberley, each of which is described under its title.

The region was settled by the Dutch in 1652. In 1795 it was occupied by the British, but seven years later they relinquished it to the Dutch, only to take possession of it again in 1806. Thirty years later the Dutch settlers, or Boers, dissatisfied with British rule, emigrated in large numbers to the north and settled what are now Orange River Colony and Transvaal Colony. Between these settlers and the surrounding native tribes the colony was frequently involved in war. In 1902 British supremacy was thoroughly established. In 1910 the colony became an original province of the Union of South Africa.

Related Articles. Consult the following titles for additional information:
Orange Free State — Transvaal
South Africa, — Union of South Africa,
South African War

CA'PER, the unopened flower bud of a low trailing shrub which grows from the crevices of rocks and walls and among rubbish, in the countries bordering on the Mediterranean. The plant was introduced into Great Britain as early as 1596, but has never been grown on a large scale. The buds are pickled in vinegar and used in making sauces for meats. The flower buds of the marsh marigold and nasturtium are frequently pickled and eaten as a substitute for capers.

CAPERCAILZIE, *ka pur kale'ze,* or **COCK OF THE WOOD,** the largest of the European grouse, weighing from nine to twelve pounds. The male has an ashy black neck; head, wings and shoulders brown, speckled with small black dots; a variable green breast, and a black belly with white spots. The tail feathers are black, with small white spots near the extremities. The flesh of the capercailzie is highly esteemed for the table in Scotland and Ireland.

CAPERNAUM, *ka pur'na um,* a town in ancient Palestine, frequently mentioned in the Bible. It was on the northwest shore of Lake Gennesaret, but its exact site is unknown. Because it was so often visited by Jesus it was often called "His own city." Many of His miracles were performed here, but the town remained unrepentant, as indicated by the rebuke given in *Matthew* XI, 23: "And thou, Capernaum, which art exalted unto heaven, shalt be brought down to hell." Peter, Andrew and Matthew had their homes in Capernaum.

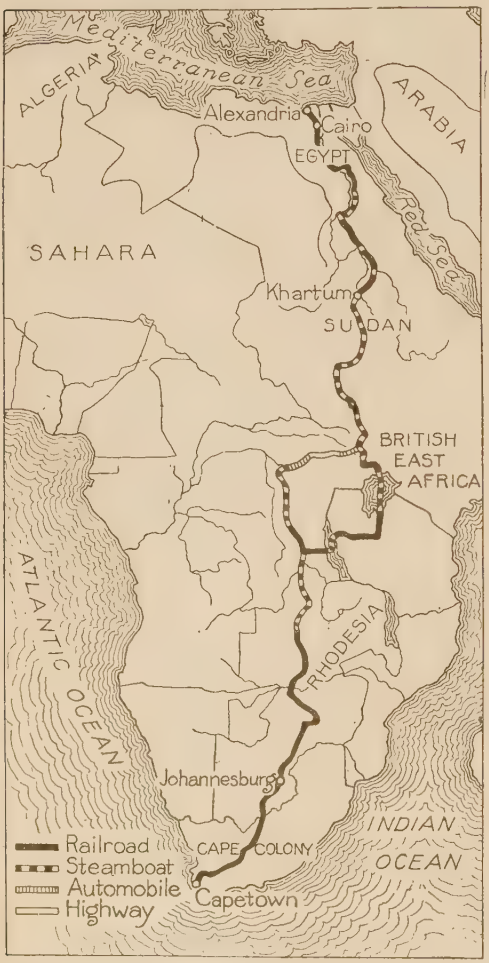
CAPE SA'BLE, the name applied to two capes. 1. The most southerly point of the mainland of Florida. 2. The southern extremity of Cape Sable Island, off the southern coast of Nova Scotia, Canada.

CAPE SAINT VINCENT, the southwest point of Portugal. It is noted for the naval victory gained here by the English, under Sir John Jervis (afterward Earl of Saint Vincent), on February 14, 1797, over the Spanish.

CAPETIAN, *ka pe'shan,* **DY'NASTY,** the dynasty which ruled in France from 987 to 1328. It began with Hugh Capet, chosen king by the help of the clergy on the death of the last of the Carolingians, and closed with Charles IV, who died in 1328. Throughout this long period, during which, for the most part, son followed father in regular succession, the royal power greatly increased, and France became more nearly a centralized state. It was during the reign of Philip the Fair, a Capetian king, that the common people, or Third Estate, first sent representatives to the National Assembly. The growth of the royal power is shown by the fact that the custom of crowning the son during the father's lifetime, common with the early kings of this house, was found unnecessary after the twelfth century.

CAPE-TO-CAIRO RAILWAY, one of the most ambitious transportation enterprises

ever undertaken, representing the great dream of Cecil Rhodes—to link the Mediterranean Sea with the Cape of Good Hope by a continuous line of travel through the African continent. This splendid project was begun in 1889. The length of the route is about 6,800 miles, and the trip between the two terminals, Cairo and Cape Town, could be made in from fifty-one to sixty-one days in 1918. This great route is twice the length of the one across Canada between Saint John



and Vancouver, and about one-fourth greater than the line between Moscow and Vladivostok. The Cape-to-Cairo Railway is, moreover, the only continental line which extends from north to south.

It was planned to build the road northward from Cape Town and southward from Cairo, and to have the two portions meet in Central Africa. This plan was consistently followed. As Kimberley and Cape Town were already connected by rail, construction work on the southern branch began at the former place in 1889, and rapid progress was made until the Zambezi River was reached. To span the river the engineers constructed a cantilever bridge below Victoria Falls; this structure, which is 420 feet above the water and has a span of 500 feet, is the highest bridge in the world. As the workers advanced farther north they encountered all the difficulties peculiar to a land remote from civilization and often infested with disease, and the progress made tells a story of heroism unsurpassed in railroad building.

The northern portion of the road was undertaken under the direction of the Egyptian government, and by 1914 about 1,400 miles of track had been laid. The World War, though it created difficulties in regard to capital and raw material, hastened construction in places where military operations were undertaken against the Germans, and the Belgian line between the Congo River and Lake Tanganyika was rushed to completion in 1915. The line which carries the railway system of British South Africa northward into Belgian Congo was extended 150 miles after the war began, and on May 22, 1918, it reached Bukama, the head of steam navigation on the upper Congo. One may therefore travel by a continuous line of railway north from Cape Town to Bukama, but the trip northward to Cairo from Bukama is as yet a succession of rail, steamship, automobile and highway journeys. In course of time rail construction will supplant other modes of travel on the northern branch, but nevertheless a reasonably easy journey from the Mediterranean to the Cape of Good Hope is now an accomplished fact.

The possibilities of the Cape-to-Cairo road are not difficult to foresee, as the success of this enterprise means greater progress in colonization and development of Africa's vast resources. Many branch lines running east and west connect with this great backbone of the continent, and others are in process of completion. See RHODES, CECIL; AFRICA.

CAPE TOWN, SOUTH AFRICA, the capital of the province of the Cape of Good Hope and the legislative capital of the Union of

South Africa, situated thirty miles north of the Cape of Good Hope. The city has a beautiful location on the slopes of Table Mountain, and contains numerous parks and many fine buildings, among which are the Houses of Parliament, the Supreme Court, the South African Museum, the cathedral, a number of churches and mosques and a synagogue. There are also numerous educational institutions, including colleges and an examining university, besides the Cape Observatory. The harbor is protected by a breakwater over 4,000 feet long, and the docks cover an area of sixteen acres.

Cape Town is a port of call for nearly all vessels passing around the Cape of Good Hope, and in commercial importance it is surpassed in rank only by Port Elizabeth. Its trade is with nearly all ports on the Atlantic and Indian oceans. It is connected by railway with all the important towns of the province and surrounding provinces and is the southern terminus of the Cape-to-Cairo Railway. Population, 1911, including suburbs, 67,000, of whom 29,933 were white.

CAPE VERDE, *vurd,* the extreme west point of Africa, between the Senegal and the Gambia, discovered by Fernandez in 1445. The appearance of a group of baobab trees, with their green tops showing on the white coast, is said to have suggested the name.

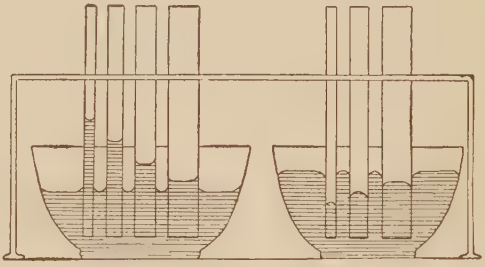
CAPE VERDE ISLANDS, a group of volcanic islands and rocks in the Atlantic Ocean west of Africa, belonging to Portugal. Their area is 1,480 square miles. They produce rice, maize, coffee, tobacco, sugar cane, nuts and various fruits. Most of the inhabitants are negroes or of mixed race. The chief town is Praya, a seaport on Santiago, the largest island. Porto Grande, on São Vincente, is a coaling station for steamers and has the best harbor in the group. The islands are named for Cape Verde, on the coast of Africa nearest to them. Population, 150,000.

CAPE WRATH, the northwest extremity of Scotland, in Sutherlandshire. It is a pyramid of gneiss bearing a lighthouse, the light of which is 400 feet above sea level. The cape is noted for its aspect of grandeur.

CAPIAS, *ka'pi as,* a Latin word meaning *you may take,* is the name given in law to a common-law writ requiring an officer to arrest a person and hold him in custody. The capias is rarely issued, having been superseded by other statutory writs. See ARREST.

CAPILLARIES, *kap'i la riz,* in anatomy, the fine blood vessels which connect the arteries with the veins. Some of the capillaries are so small that only one blood corpuscle at a time can pass through. They are largest in the marrow of the bones and smallest in the brain, and in certain organs they divide and subdivide, forming a network. The capillary walls are thin and composed of but one layer of tissue; through them the blood receives waste products and gives up nutritious material. The blood in the capillaries of the lungs receives oxygen and gives up carbonic acid. See BLOOD; CIRCULATION.

CAPILLARITY, the tendency of liquids in small tubes and porous bodies to rise above the level of the liquid in a vessel surrounding the smaller tube. Capillarity can be shown by placing small glass tubes or straws in a vessel of water colored with a little ink. If the tubes are of different size they will show that the liquid rises highest in the smallest tube (see Illustration). By innumerable tests in this manner was proved the principle



CAPILLARITY

that the smaller the tube the stronger the capillarity. Capillarity is due to the adhesion of the liquid to the walls of the tube or the vessel, and a close examination will show that the surface of a liquid in a vessel is concave, the portion touching the walls of the vessel being raised above that in the center. When mercury is confined in a glass vessel, the principle of capillarity is reversed, as there is no adhesion, and the surface of the mercury is convex.

The part which capillarity plays among natural phenomena is a very varied one. By it the fluids circulate in the porous tissues of animal bodies, the sap rises in plants and moisture is absorbed from air and soil by the foliage and roots. For the same reason a sponge or lump of sugar, or a piece of blotting paper, soaks in moisture, and the oil rises in the wick of a lamp.

CAPITAL, in business, is the entire group of articles and materials from which the owner hopes to derive an income. The list includes money, land, buildings, machinery, tools and raw materials necessary to the conduct of an enterprise. It is commonly divided into two main classes—circulating capital and fixed capital. *Circulating capital* comprises those forms of capital which require renewal after every use in production, being consumed (absorbed or transformed) in a single use; for instance, raw materials. *Fixed capital,* on the other hand, comprises every form of capital which is capable of use in a series of similar productive acts; for example, machinery and tools. From the ordinary economic point of view, capital is conveniently limited to material objects directly employed in the reproduction of material wealth, but from the higher social point of view many things less immediately concerned in productive work may be regarded as capital. Thus, Adam Smith includes in the fixed capital of a country "the acquired and useful abilities of all the inhabitants;" and the wealth sunk in prisons, education and other uplifting institutions plays, ultimately, a scarcely less important part in the production than that invested in directly productive machinery.

The return which capital yields in production is termed *interest,* to distinguish it from *rent,* which is the return for the use of land, and *wages,* or the return to labor .

During recent years capital has shown a marked tendency to concentration; or, more accurately, the *management* of capital has tended to pass into few hands. This has served to draw more sharply the distinction between the capitalist and laboring classes and to increase their feeling of antagonism. Although most economists declare the interests of both sides to be ultimately identical, the crushing out of small owners and the fear of the absolute power to fix both price of labor and of product which may, by absence of competition, come into the hands of the great owners, have created a strong opposition to the centralizing of capital. It has the advantage, however, of making possible a lowered cost of production and of preventing wasteful competition. Various schemes for the public ownership and direction of capital are the inevitable outgrowth of the condition of dissatisfaction. See SOCIALISM; TRUSTS; TRADES UNIONS.

CAPITAL, an architectural term, usually restricted to the upper portion of a column, the part resting immediately on the shaft and separating it from the entablature, or other portion of the structure above the pillar. In classic architecture, each order has a peculiar form of capital, which is, more than anything else, its distinguishing characteristic.

Belonging to the three orders of Grecian architecture, respectively, are the *Doric,* the *Ionic* and the *Corinthian* capitals, of which the first was later modified by the Romans in their *Tuscan* columns, and the last two combined in the *Composite* order. (The classic orders are fully explained and illustrated in the article COLUMN.) From these developed the various Gothic capitals.

CAPITAL LETTERS, the large letters used in writing and printing. They are used most commonly as the initial letters of certain words, or of all words in certain positions. During the Middle Ages, as well as in ancient times, there was no distinction between different kinds of letters, but the custom of illuminating the first letter of a book or of a chapter gradually gave rise to a more general use of large letters. In almost all countries, sentences and proper names begin with capital letters. In German every noun begins with a capital, and this was formerly the rule in English. Adjectives which are derived from proper names are in English begun with capitals, as *French,* and *Canadian,* but this is not true of most other languages.

CAPITAL PUNISHMENT, a term derived from the Latin *caput,* meaning *head,* refers to the penalty of death imposed by a court upon a man or woman found guilty of wilful murder or treason. The methods employed in America are hanging, electrocution or shooting. In Utah and Nevada the latter is a legal execution; there a condemned man may choose whether he shall be shot or hung.

Capital punishment prevails in all the states except Kansas, Maine, Michigan, Minnesota, Missouri, North Dakota, Oregon, Rhode Island, South Dakota, Tennessee, Washington and Wisconsin. Hanging is the method employed, but electrocution (which see) has been adopted in Arkansas, Indiana, Kentucky, Massachusetts, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Vermont and Virginia.

In Europe, hanging is resorted to in Great Britain, Austria and Russia; in Germany criminals are beheaded or shot; in France the guillotine is being rapidly supplanted by hanging; in Spain the garrotte (which see) is occasionally used, but the condemned is usually sentenced to penal servitude in chains. Other countries on the continent have abolished the death penalty. Japan hangs its criminals within prison walls.

CAPITALS OF THE UNITED STATES. Since the adoption of the Declaration of Independence, nine different cities other than Washington have been for longer or shorter periods the seat of government of the United States. The famous Continental Congress which adopted the Declaration sat in Philadelphia from September 5, 1774, to December, 1776, but during the Revolution, in order to avoid the British, it was necessary to make frequent changes in regard to the meeting place of Congress. The list covering the period from December, 1776, to June, 1790, is as follows:

Baltimore, Dec. 20, 1776, to Mar., 1777.
Philadelphia, Mar. 4, 1777, to Sept., 1777.
Lancaster, Pa., Sept. 27, 1777, to Sept. 30, 1777.
York, Pa., Sept. 30, 1777, to July, 1778.
Philadelphia, July 2, 1778, to June 30, 1783.
Princeton, N. J., June 30, 1783, to Nov. 20, 1783.
Annapolis, Md., Nov. 26, 1783, to Nov. 30. 1784.
Trenton, N. J., Nov. 30, 1784, to Jan., 1785.
New York, Jan. 11, 1785, to June, 1790.

Philadelphia was the temporary capital until 1800, but the Constitution, drafted in 1787, had made provisions for the selection of a Federal district and national capital. President Washington chose a site on the Potomac (see DISTRICT OF COLUMBIA), and in 1800 the city of Washington became the permanent seat of government.

CAP'ITOL, in Roman history the name of the smallest of the seven hills of Rome, called also the Capitoline Mount. The hill had two summits, a northern and a southern; on the latter stood the great temple to Jupiter, while the former was the site of the citadel of Rome. The temple to Jupiter, in which the state religion had its center, was itself sometimes called the Capitol. Other edifices on the hill included the temple of Jupiter Tonans (thundering) and the Tabularium, in which were kept the public records.

The word *capitol* is applied to-day to a building which houses the government offices of a state, province or country. It is located in the seat of government, or *capital* city.

CAPPADOCIA, *kappa doh'she ah*, in antiquity, one of the most important provinces in Asia Minor, the greater part of which is included in the modern province of Karaman. Its boundaries varied greatly at different times. It was conquered by Cyrus and was ruled by independent kings from the time of Alexander the Great until A. D. 17 when it became a Roman province.

CAPRICORNUS, *kap ri kawr'nus* (the goat), a constellation of the southern hemisphere and the tenth sign of the zodiac, marking the winter solstice, about December 21, Capricornus was represented by (♑), the horns of a goat, and in art as a figure having the fore part like a goat and the hind part resembling a fish. Capricornus is the name given to the southern tropic. See TROPICS.

CAPRIVI, *ka pre've*, GEORG LEO, Count von (1831–1899), second Chancellor of the German Empire. He entered the Prussian army in 1849, served in the war of 1866 and the Franco-German War and was advanced rapidly in rank. In 1882 he was given command of the third army division, and from 1883 to 1888 he was at the head of the admiralty, in which position he reorganized the navy. He held command of the tenth army corps, stationed in Hanover. In 1890 Caprivi became Bismarck's successor as Chancellor, and proved himself a man of great ability.

CAPSICUM, *kap'si kum*, a genus of annual, shrubby plants, with a wheel-shaped corolla, projecting and converging stamens and a many-seeded berry. They are chiefly natives of the East and West Indies, China, Brazil and Egypt, but they have spread to various other tropical or subtropical countries, being cultivated for their fruit, which at times reaches the size of an orange, is fleshy and variously colored and very sharp to the taste.

The fruit or pod is used for pickles and sauces, and also is valuable medicinally. Dried or powdered, the pods are used in making a gargle for sore throat, and they are also employed in the treatment of neuralgia and rheumatism. Cayenne pepper and chili, the favorite condiment of the Mexicans, is prepared from a species of capsicum.

CAP'SULE, a medical term used with two meanings. It refers to a thin membrane

which covers certain parts of the body, as the kidney and lens of the eye, and it is also used to designate a small cylindrical

CAPSICUM

envelope which forms a casing for pills or powders that are unpleasant to the taste.

CAPUA, *kah'pu a,* ITALY, a fortified city in the province of Caserta, situated on a plain eighteen miles north of Naples, on the Volturno. It is the residence of an archbishop and has a cathedral. Population, 1911, 13,319. The ancient city, which figures prominently in Roman history, was situated three and one-half miles southeast of the modern town. Its site is now occupied by the city Santa Maria di Capua Vetere. The ancient Capua was of such extent as to be compared to Rome and Carthage. It was a favorite place of resort of the Romans, on account of its agreeable situation and its healthful climate and many existing ruins, including an amphitheater, attest its ancient splendor.

CAPUCHINS, *kap'uchinz,* or *kap u sheenz',* monks of the Order of Saint Francis, so called from the capouch, or hood, which is the distinguishing badge of the Order. They are clothed in brown or gray, go barefooted and never shave their beards. According to the laws of the Order the monks must live by begging and may use no gold, silver or silk about their altars. The members are most numerous in Austria. There are Capuchin monasteries in the dioceses of Milwaukee and Green Bay, Wis., New York City and Leavenworth, Kan.

CAPYBARA, *kah pe bah'ra,* a species of rodent, sometimes known by the name of the water hog. It attains the length of about three feet, and has a very large and thick head, a thick body, covered with short, coarse, brown hair, and short legs, with

THE CAPYBARA

long feet. It has no tail. The capybara is common in several parts of South America, and particularly in Brazil. It feeds on vegetables. In the water the animal is perfectly at home. Its flesh is edible.

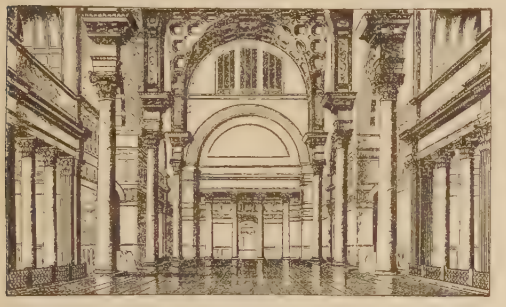
CARABAO, *kah rah bah'o,* a variety of Asiatic water buffalo, found in the Philippine Islands. Like others of the group, it is characterized by a fondness for ponds, bogs and marshes. Though it is very slow-moving, and refuses to work when the day becomes very hot, the carabao is greatly valued as a beast of burden in its native land, and before the modernization of Manila it was a familiar sight in the business streets of that city. The animal is of a slaty bluish-black color. Among its peculiarities is an extreme dislike for white people.

CARACAL, *kar'a kal,* a species of lynx, native of Northern Africa and Southwestern Asia. It is about the size of a fox and is usually of a deep-brown color, having tufts of long black hair which terminate the ears. It possesses great strength and fierceness.

CARACALLA, *kar a kal'la* (188–217), emperor of Rome from 211 to 217, the son and successor of Septimus Severus. *Caracalla* was a nickname applied to the youth by his father, with reference to the hooded Gallic tunic he was fond of wearing. After he came to the throne Caracalla ordered the

massacre of thousands of his enemies, and following a brief reign of six years he was murdered in Mesopotamia. His name is associated, however, with some of the most celebrated baths of Rome (see below) and with the granting of citizenship to all free inhabitants of the Roman Empire.

Baths of Caracalla. These were built in A. D. 212. They consisted of a group of buildings, the central one of which contained large halls surrounded by gardens, the whole covering 129,600 square yards. The thick walls were covered with marble and the floors were mosaic. The buildings were lavishly adorned with statuary and



BATHS OF CARACALLA

other works of art many of which have been preserved. Water was supplied by the Marcian Aqueduct, and accommodations were made for 16,000 guests.

CARACAS, *kah rah'kahs,* VENEZUELA, the largest city and the capital of the republic, is situated in a fine valley about 3,000 feet above the Caribbean Sea. It is connected by railway with the port La Guayra, which is about six miles distant. It has some good buildings, including a cathedral, a university, the federal palace and other government buildings. Caracas has various parks and gardens, electricity, gas and water supply, telephones and tramways. The export trade is in cacao, coffee and tobacco. In 1812 the city was in great part destroyed by an earthquake, and nearly 12,000 persons were buried in the ruins. Population, about 85,000.

CAR'AMEL, the brown mass which is produced when cane sugar is heated. It is used in cooking as a coloring and flavoring ingredient and in giving a brown color to spirits and other liquids. The name is also applied to a certain preparation of candy.

CAR'AT, a weight of 3.17 troy grains, used by jewelers in weighing precious stones and pearls. It is divided into 4 *carat grains,* which, in turn, are divided into 2, 4, 8 or 16 parts for more accurate measurements. The term is also used to express the proportionate fineness of gold, a carat being $\frac{1}{24}$ of unit weight of metal. So, if $\frac{18}{24}$ of an alloy is pure gold, it is said to be "18 carats fine," and when it is "24 carats fine" it is pure, or "solid gold."

CARAVAGGIO, *kah ra vah'jo,* MICHELANGELO MERISI DA (1569–1609), a celebrated Italian painter, born in Caravaggio. In his youth he prepared plaster for the artists, and while engaged in this work he acquired the desire to become a painter. He studied at Milan and Venice, where he was influenced by the works of Giorgione, and later went to Rome, where he found a patron in Cardinal del Monte. The turbulent disposition of Caravaggio involved him in frequent quarrels, in one of which he killed a companion at Rome. He was forced to flee and went to Naples and Malta. Caravaggio was the head of the naturalists and exerted a marked influence on the development of modern art. His paintings, though sometimes coarse, display grandeur and power. His most celebrated works are *Entombment of Christ, Saint Sebastian* and *Supper at Emmaus.*

CAR'AVAN, a Persian word used to denote the large companies which travel together across the Asian or African deserts, for the sake of security from robbers. Most numerous of these caravans are the associations of merchants; but caravans of pilgrims, going from Cairo or Damascus to Mecca, cross the deserts every year. Camels are used as a means of conveyance on account of their remarkable powers of endurance. See CAMEL.

CAR'AVEL, the name once applied to various forms of small vessels, particularly to a small ship used by the Spaniards and Portuguese in the fifteenth and sixteenth centuries for long voyages. The ships in which the first expedition of Columbus sailed were caravels. They were narrow at the poop, wide at the bow and carried a double tower at the stern and a single one at the bow. There were four masts and a bowsprit, and the principal sails were lateen sails. Exact reproductions of the three ships of Columbus were exhibited at the World's Fair held at Chicago in 1893, and afterwards were placed in Jackson Park, in that city. Only one remained in 1919.

CAR'AWAY, a common biennial plant, with a tapering fleshy root, a furrowed stem and white or pinkish flowers. It produces a well-known seed used by confectioners and bakers and in medicine. Caraway seeds are characterized by a spicy fragrance and an aromatic taste, and from them is distilled a light, volatile oil.

CARBOHYDRATE, *kar bo hy'drate,* the name of a class of substances forming an important element in the daily food of the average person. Carbohydrates are chemical compounds of carbon, oxygen and hydrogen. Important examples are sugar of various kinds, starch and cellulose (which see). Vegetable foods are especially rich in carbohydrates; starch is an important ingredient of wheat, oats, corn and the other grains, and of potatoes, and special sugars constitute a distinctive element in the composition of honey and fruits. In milk is found a carbohydrate called *lactose.* Carbohydrates and fats are the fuel-making and fat-producing elements, while proteins serve to build muscle. A diet consisting of all of these food substances is essential to the welfare of the body. See PROTEIN.

CARBOLIC, *kar bol'ik,* **ACID, PHENIC,** *fe'nik,* **ACID,** or **PHENOL,** *fe'nol,* an acid obtained from coal tar. When pure it occurs in the form of colorless crystals, but on exposure to the light the crystals turn red. It is generally marketed in the form of a colorless, oily liquid, which has a burning taste and the odor of creosote. Carbolic acid is a powerful disinfectant, and is used in large quantities in hospitals for cleansing purposes. It is a deadly poison and can be safely taken internally only when greatly diluted. It causes painful burns when applied to the skin. For directions regarding remedies for poisoning from the acid, see ANTIDOTE.

CAR'BON, one of the elements, existing uncombined in three forms, as charcoal, as graphite, or plumbago, and as diamond. The diamond is the purest form of carbon; in the different varieties of charcoal, in soft coal and in anthracite, it is more or less mixed with other substances. Pure charcoal is a black, brittle, light and inodorous substance. It is usually the remains of some vegetable body, from which all the volatile matter has been expelled by heat; but it may be obtained from most organic matters, animal as well as vegetable, by ignition in closed vessels.

The compounds of this element are more numerous than those of all the other elements taken together. With hydrogen, especially, it forms a very large number of compounds, called hydrocarbons, which are possessed of the most diverse properties, chemical and physical. With oxygen, on the other hand, it forms only two compounds, carbonic oxide and carbonic-acid gas (which see). See DIAMOND; CHARCOAL; GRAPHITE; COKE.

CARBONATES, *kar'bon ates,* compounds formed by the union of carbonic acid with a base. Carbonates are an important class of salts, many of them being extensively used in the arts and in medicine. They include carbonate of soda, or sal soda, a much-used washing powder; bicarbonate of soda, used in cooking; carbonate of copper, from which copper is extracted; and carbonate of iron, or siderite.

CAR'BONDALE, PA., founded in 1861 and named for the great deposits of coal in the vicinity, is a city in Lackawanna County, on the Lackawanna River, sixteen miles northeast of Scranton. Anthracite coal mining is the basis of the city's industrial life, but there are railroad shops and manufactures of ice refrigerating machinery, silk, and beer. Transportation is provided by the Erie, the Delaware & Hudson and the New York, Ontario & Western railroads. Five miles distant, at Fairview, is the state criminal insane asylum. From the city's location in the mountains a view of the distant Catskills may be had on clear days. The commission form of government was adopted in 1913. Population, 1910, 17,040; in 1917, 19,597 (Federal estimate).

CARBON DISULPHIDE, *di sul'fide,* or **CARBON BISULPHIDE,** a compound of carbon and sulphur, which is known as a thick, colorless liquid. When pure, it has rather a pleasant odor, but ordinarily, owing to the presence of impurities, it has a very disagreable smell. It evaporates rapidly, and by passing a current of air over it very low temperature may be obtained in its use. It is a strong solvent for such substances as India rubber, gutta-percha, the resins and phosphorus. Carbon disulphide is used in the manufacture of artificial silk from wood pulp, and occasionally to kill rats, mice, insects and other animal pests. It is manufactured by heating together carbon and sulphur.

CARBON'IC-AC'ID GAS, or **CARBON DIOXIDE**, a gaseous compound of carbon and oxygen, colorless, without smell, twenty-two times as heavy as hydrogen, and existing in the atmosphere to the extent of three volumes in 10,000. It is poisonous to animals. This is probably due to the fact that animals cannot separate the oxygen of the compound from the carbon, and consequently suffer from a lack of free oxygen when they inhale the carbon dioxide.

Carbonic-acid gas is set free from fermenting liquors and from decomposing vegetable and animal substances, and is largely evolved from fissures in the earth, constituting the *choke damp* of mines. Its solution in water has a pleasant, sour, biting taste, and aerated beverages of all kinds—beer, champagne and carbonated mineral waters—owe their refreshing qualities to its presence, for though poisonous when taken into the lungs, it is agreeable when taken into the stomach. *Soda water* is water charged with carbon dioxide. Since it does not support combustion, it is used as a fire extinguisher when put up in iron cans under pressure. This gas is formed and given out during the breathing of animals, and in burning from the oxidation of carbon in the fuel. It exists in large quantities in all limestones and marbles. Plants absorb carbonic-acid gas from the air and transform it by the aid of light into plant tissue. From its weight it has a tendency to subside into low places, vaults and wells, rendering some low-lying places and many caves uninhabitable.

Liquid Carbonic Acid. Carbon dioxide, when subjected to a pressure of about 450 pounds to the square inch and a temperature of 5° F. below zero, is easily changed to liquid. This acid is manufactured on a large scale by forcing the gas into steel cylinders by means of a powerful pump, until the pressure becomes sufficient to change the gas into liquid. The large quantities of carbon dioxide produced in the process of brewing are now saved and used in this way. Liquid carbon dioxide is also made directly in factories established for the purpose. It is used in the making of soda water and other effervescent drinks.

CARBONIC OXIDE, *kahr bon'ik ox'ide*, or **CARBON MON'OXIDE**, a gaseous compound of carbon and oxygen, obtained by passing carbonic acid over red-hot fragments of charcoal, contained in a tube of iron or porcelain, and also by several other processes. It is a colorless, inodorous gas, having neither acid nor alkaline properties, is very poisonous and burns with a pale blue flame.

CARBONIF'EROUS PERIOD, the last division of the Paleozoic Era, named from the formation of the coal measures which took place at this time. East of the Rocky Mountains North America was probably all above the sea, though during the early part of the period what forms the great bituminous coal bed of the Mississippi basin may have been the bottom of a shallow lake. In all continents marshes and swamps became choked with a rich growth of vegetation, and during the period there were numerous elevations and subsidences of the land, as shown by the large number of veins found in the coal measures.

The vegetation included rushes, club mosses, ferns and lepidodendrons, which are now extinct, all of which grew to a great size. Ferns often formed trees having trunks more than twenty feet in height, and club mosses attained a height of seventy-five or one hundred feet. It was from these plants that most of the coal was formed, and their universal distribution, as they are found in all coal measures, shows that the conditions of climate and moisture were uniform throughout the earth. The animal life of the period included insects, scorpions, amphibians, crinoids, mollusks and fishes. See COAL; PALEOZOIC ERA; GEOLOGY.

CARBONIFEROUS SYSTEM, in geology, the great system of rocks which lie between the Devonian system below and the Permian system above. The rocks take their name from the quantities of coal, shale and other carbonaceous matter contained in them. They include the coal measures, millstone grit and mountain limestone, the first being uppermost and containing the chief coal fields that are worked. Iron ore, limestone, clay and building stone are also yielded abundantly by the carboniferous strata, which are found in many parts of the world, often covering large areas. See CARBONIFEROUS PERIOD; COAL; GEOLOGY.

CARBON MON'OXIDE. See CARBONIC OXIDE.

CARBORUNDUM, *kahr bo run'dum*, a polishing substance made by mixing in proper proportions coke, sand, sawdust and a small quantity of salt, and smelting the mixture in an electric furnace specially

constructed for the purpose. The heat required is more intense than that necessary for any other known process, and the time for converting the mixture into carborundum is about thirty-six hours. Carborundum is so hard that it can be used in the place of corundum and emery as an abrasive, and also for glazing brick and for the lining of furnaces that are subjected to great heat. It is made extensively at Niagara Falls. See ABRASIVES; CORUNDUM; EMERY.

CARBUNCLE, *kahr'bung k'l,* a name applied to any one of the scarlet and crimson varieties of garnet, when the stone is cut with a convex face. By the ancients the carbuncle was valued because of its supposed power of shining brightly in the dark. There is a legend that Noah used carbuncles and other stones to illuminate the ark. See GARNET.

CAR'BURETOR, a device on an internal-combustion engine which receives fuel in the form of gasoline, kerosene or alcohol and transforms it completely into gas, so it will burn instantly without smoke, or carbon. Not only does it vaporize the fuel, but it mixes it with the proportion of air necessary for complete combustion. It must be so constructed that the flow of air and gas through it may instantly vary in accordance with speed demands for an increase or decrease of fuel.

How Carburetion is Effected. The process of mixing air and fuel and completely vaporizing the mixture is called *carburetion.* The fuel enters the carburetor by a feed pipe from a large fuel tank. The quantity admitted is regulated by a float; when the fuel chamber is sufficiently full the float rises and closes a valve in the feed pipe. A passage leads from the float chamber to a jet nozzle, which sprays the fuel into a chamber where mixing with air occurs; action of the piston in the engine draws the fuel into the mixing chamber. When the engine is not running the starter or hand crank must "turn the engine over" to start this suction.

The only outlet from the carburetor is to the cylinders of the engine. The thoroughly-mixed gas enters the cylinders and there encounters electric sparks from spark plugs, which explode it.

The subsequent processes by which the power thus produced is transmitted and made to do work is told in the article Gas Engine.

CARDAMOM, *kahr'da mum,* the dried fruits and seeds of different species of plants called cardamoms. They have a sharp, aromatic taste, and are used to make curries, sauces and cordials, as well as for the relief of colic. Those recognized in America as *true* or *official cardamoms* and known in commerce as *Malabar cardamoms,* are the produce of a plant of the mountains of Malabar, in British India, from which country they are imported.

CARDAMOM
a, cross section of fruit; b, fruit; c, flower; d, seeds.

CARD'BOARD, a stiff, hard material used extensively in making boxes, calling cards, etc. A piece of cardboard consists of several layers of paper pasted together. A grade known as *bristol board,* made entirely of white paper, is used by artists, but ordinary cardboard consists of a core of one or more sheets of coarse cartridge paper, and an outside covering of fine white paper. Bookbinders use a coarse brown cardboard as the

basis of book covers. This is called *millboard.* Calling cards are pieces of fine cardboard which have been brushed with a mixture of white lead and size.

CARDENAS, *kahr'da nas,* CUBA, a seaport in the province of Matanzas, on the north coast of the island, eighty miles east of Havana, with which it is connected by rail. It is one of the principal commercial centers of the island, the chief exports being sugar, molasses and coffee. Population, 1914, 32,028.

CAR'DIFF, WALES, the chief port of the country, situated at the mouth of the Taff River, 170 miles west of London. It is the capital of County Glamorgan and the most important commercial center of Wales. The place has a thriving coal and iron trade and contains shipyards, iron plants and manufactories of tin and steel. The docks are extensive and at high tide can be reached by the largest vessels. The important buildings are the Castle, erected in the eleventh century; the Church of Saint John, built in the thirteenth century, a public library and a university college. Population, 1911, 184,663.

CARDINAL, a dignitary of the Roman Catholic Church, next in rank to the Pope. The cardinals are members of the Sacred College, and are appointed by the Pope; they help him in the management of the affairs of the Church, and on his death they elect one of their members as his successor. The number in the Sacred College may vary, though it was fixed at seventy by Sixtus V in 1586. There are but few English-speaking cardinals; the greater number are Italians. The first cardinal of the United States was McCloskey, appointed in 1875. In 1919 there were three living American cardinals—James Gibbons of Baltimore, William H. O'Connell of Boston, and Patrick J. Hayes of New York. Diomede Falconio was appointed a cardinal while he was in America, but he was transferred to Rome in 1913.

The insignia of a cardinal are the cardinal's red hat, given by the Pope, but not worn; the *biretta,* or red cap; the sapphire ring; the purple cassock; the miter of white silk.

CARDINAL BIRD, or **REDBIRD,** a showy North American finch, with fine red plumage and a crested head. A black patch is conspicuous on each side of the bill. The cardinal whistles beautifully, and his clear, ringing note is a great favorite, especially in the Southern states, where the bird is often kept in captivity.

The birds are found in Southeastern Canada and in Eastern United States from New York to Florida. They are permanent residents of certain districts south of the Ohio River, and have been charmingly written about by James Lane Allen in his *Kentucky Cardinal.* They are easily tamed, and in city parks often learn to come to the call of people, who feed them with nuts.

CARDINAL FLOWER, the name commonly given to one of the lobelias, because of its large, very showy and intensely red flowers. It is a native of low, swampy places in the United States and Canada, and is much cultivated in gardens in Britain. See LOBELIA.

CARDS, PLAYING, pasteboard cards, bearing printed symbols and used for the purpose of playing games of chance and skill. They are of ancient origin, being used probably by the Egyptians, the ancient Jews and the peoples of the Orient before the Christian Era. It is supposed that cards were introduced into Europe by the Crusaders or by the Moors. The set of cards commonly used in Europe and America is known as a *pack* or a *deck* and consists of fifty-two cards, in four *suits* or classes, known as *clubs, spades, diamonds* and *hearts,* distinguished by the shape of the *spots,* or *pips,* upon their faces, and by colors. Each suit contains thirteen cards, the first ten distinguished by the number of spots or pips; the last three, known as *face cards* and called *Jack* or *Knave, Queen* and *King,* respectively, bear fantastic representations of human characters corresponding to these titles.

Related Articles. Cards are used according to many sets of rules, for which see articles upon the common games, including:

Casino	Euchre
Cribbage	Solitaire
Draw Poker	Whist

CA'REY, HENRY (1696–1743), a British composer, dramatist and poet. He wrote the words and music of many popular songs, including *Sally in Our Alley* and *God Save the King.*

CARIBBEAN, *kair i be'an,* **SEA,** that portion of the North Atlantic Ocean lying between the coasts of Central and South America and the West India Islands. It communicates with the Gulf of Mexico by

the Yucatan Channel. All ships emerging from or entering the Panama Canal at the Atlantic end must pass through the Caribbean. The chief arms are the gulfs of Honduras, Darien and Venezuela. The length of the sea from the west is 1,700 miles, and its greatest width is about 700 miles.

CARIBOU, the American reindeer, which is now rarely found south of Canada, but which was formerly common as far south as Wyoming. Caribou roam about in the summer, but in winter they gather together in herds, feeding on winter berries and the leaves of shrubs. Their large hairy hoofs enable them to travel easily in the snow. They have large antlers, one branch of which extends over the forehead in front. Caribou are protected from extermination in Canada and the United States by game laws. See REINDEER.

CARICATURE, *kar'i ka ture,* a grotesque picture or representation of a person or thing, the peculiarities being so exaggerated as to appear ridiculous. The art is an old one and was practiced by the Egyptian and Assyrian artists, as well as by the Greeks and Romans. It was popular among all the European nations during the Middle Ages. The invention of printing made it possible to circulate caricatures more freely, but in many countries there was so little liberty allowed by the rulers that the art could not flourish. With the greater freedom of the press the growth has been more rapid. At the present time most of the daily papers and many of the magazines publish caricatures, which influence public opinion almost as much as that which is written. In the United States, *Judge* and *Life;* in England, *Punch;* in France, *Charivari;* in Germany, *Fliegende Blätter* are periodicals devoted to caricature and humor.

Thomas Nast, who originated the Tammany tiger, the Republican elephant and the Democratic donkey, was one of the earlier American caricaturists. He has been followed by Davenport, Outcault, Opper, McCutcheon, Briggs, Darling, Fox, Orr and others. Some of the greatest caricaturists of the world were produced by England, including Hogarth, Cruikshank, Tenniel and Du Maurier.

CARLETON, *kahrl'ton,* GUY, SIR (1724–1808), a British soldier and colonial governor, who held the chief command of the British army at the close of the Revolutionary War. He served during the French and Indian Wars in America, in 1766 was appointed lieutenant-governor, and in 1775 governor, of Quebec. Later he took supreme command of the British forces in Canada, successfully repelled the American attacks in the early years of the Revolution and was raised to the rank of lieutenant-general. In 1777 Carleton was superseded by Burgoyne, but at the close of the war succeeded Sir Henry Clinton as commander in chief. For his service he was created Baron Dorchester by the king and was granted a pension of £1000 a year. From 1786 to 1796 he was again governor of Quebec, proving a popular and able administrator.

CARLETON, WILL (1845–1912), an American poet who gained a wide circle of readers among those who enjoy verse that touches upon everyday life. Homely philosophy, genial humor, pathos and a gift for simple, natural rhythm are the chief characteristics of his poetry. He was born in Hudson, Mich., and was graduated at Hillsdale College in that state. Soon after he left college he began to lecture in various parts of the United States and Canada. In his lectures he always delighted his audiences by reciting from his own writings. His best known works are poems of domestic life, compiled as *Farm Ballads, Farm Legends, Farm Festivals* and *City Ballads.*

CARLISLE, *kahr lyle',* PA., founded in 1751, is the county seat of Cumberland County, eighteen miles southwest of Harrisburg, on the Philadelphia & Reading and the Cumberland Valley railroads. It lies in a fine agricultural district. The manufactures include chains, frog switches, axles, paper boxes, hosiery and carpets. The city is the location of Dickinson College (non-sectarian); Metzger Institute for Girls is now a part of this school. Until 1918 the famous United States Training and Industrial School, called the Carlisle Indian School, gave the town national fame. In that year it was closed by the government, and the barracks were transformed into hospitals. Population, 1910, 10,303; in 1917, 10,795 (Federal estimate).

CARLOS I (1863–1908), king of Portugal, was the son of King Luiz I and Queen Maria Pia, daughter of King Victor Emmanuel II of Italy. In 1886 he married Marie Amelia, daughter of the Duke of Orleans. In 1889 he ascended the throne. On

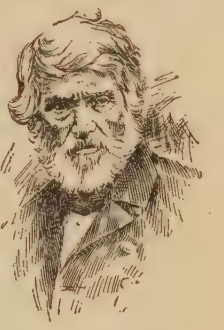
Feb. 1, 1908 , Carlos and his eldest son were shot by revolutionists while driving in Lisbon. Manuel, his second son, ascended the throne, assuming the title of Manuel II. In 1910 he was deposed, a republic was established, and Manuel went to England to live.

CARLOVINGIANS. *kahr lo vin' je anz.* See CAROLINGIANS.

CARLSBAD, *kahrls' baht,* or **KARLSBAD,** BOHEMIA, a famous watering place situated on the banks of the Tepl River, at the point where it joins the Eger. Carlsbad is 116 miles northwest of Prague, and lies in a picturesque valley 1,165 feet above the sea. The place owes its fame to the mineral springs in the vicinity, the waters of which are helpful to those suffering from dyspepsia, rheumatism and gout. The city is a pretentious place, with many handsome buildings and a magnificent park. The chief industries are the bottling and shipping of the mineral water and manufacturing. Over 68,000 persons visit Carlsbad annually in peace times, but the permanent population is about 17,000.

CARLSRUHE, *kahrls roo'e,* or **KARLSRUHE,** GERMANY, an important manufacturing city in the southwestern part of the country, capital of the grand duchy of Baden, in the days of the German Empire. It lies five miles east of the Rhine and thirty-nine miles northwest of Stuttgart. As one of the great industrial centers of Southwestern Germany, Carlsruhe was an important munitions center in the World War, and was repeatedly bombed by allied airships. The city is noted for its handsome streets, squares, parks, monuments and public buildings. Its most notable edifices include the palace of the grand duke, from which seventeen streets radiate like an outspread fan; the court theater; a court library possessing 190,000 volumes; and a number of fine museums. Carlsruhe dates from the erection of a hunting palace built in 1715 by the Margrave Carl Wilhelm. Population, 1910, 134,31.

CARLYLE, *kahr lile'* THOMAS (1785–1881), a British essayist of the Victorian period, one of the most forceful writers in English literature. He was a bitter opponent of sham and hypocrisy, and he unceasingly upheld the dignity of labor and the beauty of sincerity. Carlyle was of Scottish descent. He was born at Ecclefechan, Dumfriesshire. He was intended for the Church and in his fifteenth year was sent to the University of Edinburgh, where he developed a strong taste for mathematics. Having renounced the idea of becoming a minister, he became on his graduation a teacher; but he disliked this work and in 1818 removed to Edinburgh, where he supported himself by literary work. His career as an author may be said to have begun with the issue in the *London Magazine* of his *Life of Schiller,* which was enlarged and published separately in 1825. In 1824 he published a translation of Legendre's *Geometry,* with an essay on proportion, by himself, prefixed, and in the same year appeared his translation of Goethe's *Wilhelm Meister.* Carlyle's *Specimens of German Romance* was published in 1826, the year in which he married Miss Jane Baillie Welsh.


THOMAS CARLYLE

Although there is no doubt that the author and his wife were genuinely and deeply attached to each other, their life was far from peaceful, owing to Carlyle's temper and his wife's critical nature. After their marriage they lived for a time in Edinburgh, and then withdrew to Craigenputtock. Here he wrote a number of critical and biographical articles for various periodicals; and here, too, he wrote *Sartor Resartus* (the tailor mended), the most original of his works, the publication of which soon made him famous. He removed in 1834 to London, and three years later he brought out his *French Revolution,* a vivid, dramatic picture of that great movement.

During the years that followed Carlyle delivered several series of lectures, the most important of which is *Heroes and Hero-worship. Chartism,* published in 1839, and *Past and Present,* in 1843, were small works bearing on the affairs of the time. In 1845 appeared his *Oliver Cromwell's Letters and Speeches, with Elucidations,* and in 1850 his *Latter-day Pamphlets* came out. He next wrote a life of his friend John Sterling, published in 1851. The largest and most laborious work of his life, *The History of Frederick the Great,* next appeared, the first

two volumes in 1858, the second two in 1862 and the last two in 1865; and after this time little came from his pen. In 1866, having been elected lord rector of Edinburgh University, he delivered an installation address to the students on the *Choice of Books.* While still in Scotland the sad news reached him that his wife had died suddenly in London. For the rest of his years he lived much in retirement, and he died in 1881 in Chelsea. Carlyle's *Reminiscences and Life,* with the *Letters of Jane Welsh Carlyle,* were published by James Anthony Froude, Carlyle's literary executor, and for a time Carlyle's reputation suffered greatly by some of the revelations contained in these works.

Carlyle's intense hatred of sham was expressed in the fiercest satire, and he attempted to drive men, rather than to lead them, toward the truth he loved. The style of his works, which are everywhere distinguished by his disjointed, rugged sentences and his fiery appeals, is on the whole a true picture of the man.

CARMAN, ALBERT (1833–), a Canadian clergyman, born in Dundas County, Ontario. He was educated at the Dundas County grammar school and Victoria University, Cobourg. Carman was principal of the Dundas County high school from 1853 to 1857, when he was chosen chancellor of Albert University (later united with Victoria College). He was elected a bishop of the Methodist Episcopal church in 1874, and since 1884 has been its general superintendent. Dr. Carman is widely known as a preacher and orator. (For portrait, see article CANADA.)

CARMAN, [WILLIAM] BLISS (1861–), a Canadian lyric poet whose works show his richness of imagination and rare gift for writing melodious verse. He was born in Fredericton, N. B., and was educated at the University of New Brunswick and at Harvard and Edinburgh. His early literary work consisted of magazine and editorial writing, through which he gained a favorable reputation, and his first volume of verse, *Low Tide on Grand Pré,* was well received when it appeared in 1893. This was followed by a number of other volumes of poems, including *Songs from Vagabondia* (with Richard Hovey), *Pipes of Pan, Ballads of Lost Haven* and a *Winter Holiday.* Representative of several volumes of prose essays are his *Kinship of Nature, Friendship of Art* and *The Making of Personality.* His latest works are *Earth Deities* (1914) and *April Airs* (1916).

CAR'MEL, a range of hills in Palestine, extending from the Plain of Esdraelon to the Mediterranean Sea. It has a length of about sixteen miles and its highest point is 1,850 feet above the sea. According to I *Kings* XVIII, 19–40, it was on this range that the burnt offering was consumed by fire from heaven in answer to Elijah's prayer.

CAR'MELITES, an Order of monks of Our Lady of Mount Carmel, claimed by some to have been founded by the prophet Elijah, but as far as known, founded by Count Bertrand in 1156. Bertrand, with ten companions, went to Mount Carmel in Palestine and established the Order, but on account of the Mohammedan persecution they were obliged to remove and located in Cyprus. The habit of the Order was brown, with a white cloak, from which they were known as the white friars. The Carmelites are characterized by their self-denial in eating and drinking, and by the simple life which they lead. They were first confined to monasteries, but in the thirteenth century their Order became mendicant, and in the sixteenth century one branch of the order was known as the Barefooted Carmelites.

CAR'MEN, a popular and melodious opera based on a novel by Prosper Mérimée, a French writer. The music was also composed by a Frenchman, Georges Bizet, but the opera has a Spanish background. It is the story of a fascinating Spanish girl whose coquetry gains for her the love of Don José, a soldier. Later she accepts the attentions of a famous toreador and drives her rejected lover to a frenzy of jealousy, in which he stabs her. Since its first production in 1875, in Paris, *Carmen* has been unceasingly popular because of its wealth of melody and dramatic episodes. Patti, Mary Garden and Geraldine Farrar have been successful interpreters of the rôle of Carmen, the name part, but probably the greatest Carmen of all time was Emma Calvé.

CARMINE, *kahr'min,* a beautiful red dye derived from the dried bodies of a class of insects found in Mexico and Central America (see COCHINEAL). This coloring matter is used in silk dyeing, in minature painting and in manufacturing of artificial flowers, rouge, red ink and water colors.

CARNATION, *kahr na'shun*, the name given to many cultivated varieties of the clove pink. Carnations are among the most popular of cultivated flowers, because of their beauty, their fragrance, their long life after they have been picked, and because they blossom at all seasons of the year if properly cared for. Under cultivation, in place of the original lilac or the wild pink of southern Europe, the carnation has assumed a wide variety of forms and tints.

CARNATION

CARNEGIE, *kahr neg'i*, ANDREW (1837–1919), an American capitalist and philanthropist, who made a huge fortune but spent a large portion of it for the good of mankind. He was born at Dunfermline, Scotland, whence his father, a handloom weaver, emigrated to America in 1848. The family settled in Pittsburgh, Pa., where Andrew obtained employment first as a telegraph messenger. He became an operator and was finally promoted to become division superintendent on the Pennsylvania railroad. A fortunate acquaintance with the sleeping-car patentee laid the foundation of his success; then came prosperous ventures in oil and the starting of a rolling mill, from which has grown the largest system of iron and steel industries in the world. He was the head of the Carnegie Steel Company, the largest single interest in the formation of the United States Steel Corporation in 1901. In that year he retired from business, devoting himself thenceforth to travel, literature and philanthropy. His more important philanthropies are treated in the articles which follow.

ANDREW CARNEGIE

CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING, founded by Andrew Carnegie in 1905 and incorporated by Congress in 1906. The institution is endowed with a fund of $15,000,000 and is administered by a board of five trustees, the executive officers of which consist of a president, secretary and treasurer. While the avowed object is to provide retiring pensions for teachers in universities, colleges and technical schools of the United States, Canada and Newfoundland, in its practical application it has become an important factor in higher education. In effect, it has established uniform rules to which institutions must conform if they would enjoy its benefactions, thus standardizing requirements for students' entrance, etc., tending to break down sectarian management of schools and establishing what will result in greater uniformity in the work of professional schools. In 1913 Carnegie added an educational research fund of $1,250,000 to the original endowment.

CARNEGIE HERO FUND. In 1904 Andrew Carnegie set apart a fund of $5,000,000 for the purpose of rewarding heroic actions. The field covered by the endowment embraces the United States, the Dominion of Canada and Newfoundland, and the income is used to give financial aid to those incapacitated for work, either temporarily or permanently, in heroic attempts to save human life, and to give aid to widows and orphans of heroes. Gold, silver and bronze medals are also given. Since the original endowment similar funds have been set aside in Great Britain and Ireland, France, Germany, Switzerland, Belgium, Netherlands, Sweden, Norway, Italy and Denmark.

CARNEGIE INSTITUTION, an institution founded by Carnegie in 1902 for the purpose of promoting higher education and original research. The plan is similar to that of the Smithsonian Institution. No degrees are to be granted, and no special grade of scholarship is to be required for admission to the privileges which the Institution offers.

According to the terms of the gift the scientific departments of the government are to place their records and museums at the disposal of the students. The institution was incorporated January 4, 1902, and the board of trustees was elected on January 9. By terms of the grant the President of the United States, the President of the United States Senate, the Speaker of the House of Representatives, the secretary of the Smithsonian Institution and the president of the National Academy of Sciences are *ex-officio* members of the board of trustees. The grant specifies the following purposes of the institution: 1. To promote original research. 2 To discover exceptional men in the various departments of study. 3. To increase facilities for higher education. 4. To increase the efficiency of universities and other institutions. 5. To insure prompt publication and distribution of the results of scientific investigation. The administration building is in Washington, D. C.

CARNEGIE LIBRARIES, public libraries that have been established by thousands in English-speaking countries, through the generosity of Andrew Carnegie. His plan was to offer to any community a sum for the establishment of a public library, provided the community would pledge itself to devote for the permanent maintenance of the library a sum equal to one-tenth of the donation. Between 1881 and 1915 over $62,500,000 had been thus expended by Carnegie, and the movement has not only helped to extend general education, but has encouraged professional training for librarians and aided in establishing a uniform type of library edifice.

CARNEGIE PEACE FUND, a fund of $10,000,000 set aside in 1910 by Andrew Carnegie to aid the cause of international peace. The income is administered by a board of trustees. There are three forms of activity, relating respectively to economics and history, to international law and to intercourse and education. This organization is working in coöperation with other peace societies in various parts of the world. It issues year books showing the scope of its activities, and distributes numerous books and pamphlets. It is significant that the executive committee issued a declaration in 1917 supporting strongly the entrance of America into the World War.

CARNELIAN, *kahr neel'yan*, or **CORNELIAN**, a red variety of chalcedony, usually of a clear, rich color. It takes an excellent polish and is used in common jewelry for seals, bracelets, necklaces and other ornamental articles. It was employed by the ancients for carving and engraving purposes, and has been used by the superstitious as a charm.

CARNIVORA, *kar niv'o rah*, or **CARNIVOROUS ANIMALS**, an important order of animals whose group name refers to their flesh-eating habits. The order includes animals of varied size and habitat, but all have large, strong teeth with sharp cutting edges, so they can cut and tear the flesh-food with ease. All except the bears walk on the under surface of their toes.

The carnivora are natives of every country, with the possible exception of Australia, but the distribution of many species is peculiar and interesting. Bears are not found in Madagascar, and only one species is known in the tropical regions. The only carnivora in Madagascar are practically peculiar to the island. The raccoon family is peculiar to the New World, while nearly all of the badger, sable and otter groups are confined to the Old World. No hyenas are found in the New World. In one group are the seals, sea lions and walruses, all of which are aquatic, and most of which are confined to the ocean; all these are more or less fish-like in form, and in general their limbs are enclosed within the skin.

Related Articles. Consult such titles in these volumes as relate to flesh-eating animals, among which are the following:

Cat	Leopard
Coyote	Lion
Dog	Skunk
Ichneumon	Wolf

CARNIVOROUS PLANTS, a group of plants of many different species, that use for food small animals, especially insects. Most of these plants live in moist places, where there is an absence of nitrogen, which is supplied by the insects. The sundews or droseras, the most common, have small, thick leaves supplied with sticky, sensitive hairs which hold and press around the insect when it alights. In the Venus's flytrap the leaves are modified into hinged traps provided with bristles. The pitcher plants also belong to this group. See DROSERA; VENUS'S FLYTRAP; PITCHER PLANTS.

CARNOT', MARIE FRANÇOIS SADI (1837–1894), a French statesman, President of the French Republic from 1887 to 1894. He

was educated as an engineer and advanced rapidly in his profession, until he was appointed prefect of the lower Seine, during the siege of Paris, in 1871. After the fall of the city he was made a member of the National Assembly, and in 1886 he took office in the Brisson cabinet. On the resignation of Grévy in 1887, Carnot was elected President of France. During a celebration given in his honor at Lyons he was killed by an anarchist.

CAROLINGIANS, *kar o lin′je anz,* the second dynasty of the French or Frankish kings, which supplanted the Merovingians. They derived their name from Charles Martel. Charles Martel was mayor of the palace and virtual ruler under the weak Merovingian kings, and his son, Pippin the Short, after serving for a time as mayor of the palace, became king in 751. Pippin was succeeded by Charlemagne and his brother Carloman. Charlemagne became sole king in 771 and was succeeded in the Empire of the West by his son Louis the Pious. The latter divided his empire among his sons, and at his death (840) his son Charles the Bald became king of the part of his territory which corresponds to modern France. Charles died in 877, and was succeeded by a number of feeble princes. The dynasty came to an end with Louis V, who died in 987.

CAROT′ID ARTERIES, the two great arteries which convey the blood from the aorta to the head and brain. The *common carotids,* one on each side of the neck, divide each into two parts. One is the *external* branch, which passes up to the angle of the lower jaw, where it sends branches to the neck, face and outer parts of the neck; the other is an *internal* branch, which passes deeply into the neck, then, through an opening in the skull behind the ear, enters the brain and supplies it and the eye with blood. A wound in the carotids, unless it be a puncture, results in almost immediate death.

CARP, a family of fresh-water fishes native to Southwestern Asia, but now acclimated in all parts of the world. Carp is a favorite food fish of Europe, but because of the coarseness of its flesh it is not so well liked in the United States. It thrives and multiplies rapidly in ponds and sluggish streams, and the United States Fish Commission has stocked many such bodies of water with it. The *leather* carps have no scales. Other species are brilliantly colored, while still others are dull. See GOLDFISH.

CARPA′THIAN MOUNTAINS, a range of mountains in Southern Europe, chiefly in Austria, forming a great semicircular belt nearly 800 miles in length and partially inclosing the Plain of Hungary. The system includes a number of ranges, the Tatra range in the northwest having the greatest altitude, the highest peak being 8,737 feet. The lowest ranges are in the eastern portion and have an altitude of 5,000 to 7,000 feet. The entire system is rich in minerals, including gold, silver, quicksilver, copper and iron. There are many small but very deep lakes in these mountains.

During the World War severe fighting took place in this range between the Russians and the Austro-German forces. Thousands of men lie buried in the mountains.

CARPENTER, FRANK GEORGE (1855–), an American newspaper correspondent and geographical writer, born at Mansfield, O. In 1879 he began to write for the Cleveland *Leader,* and about ten years later traveled around the world as correspondent for a newspaper syndicate. He has since visited nearly every quarter of the globe, and has pictured for numerous readers life in lands far remote from them. Carpenter is widely known, too, for his series of popular geographical readers, embracing *How the World is Fed, How the World is Clothed* and *How the World is Housed.*

CARPENTER-BEE, a common name of a solitary bee which burrows into wood for a short distance and then excavates a tunnel for a foot or more lengthwise of the grain.

CARPENTER-BEE

Beginning at the bottom, the bee lays her eggs each in a separate cell, one above another, and all are filled with a plentiful supply of food for the larvae. See BEE.

CAR′PET, a floor covering made of wool, cotton, hemp, or other material. Woven

carpets were first used in Oriental countries and were woven in one piece, but now they are made in narrow strips, to be sewed together. They were introduced from the East into Europe. The first carpet factory in Europe was established in Paris in 1607. The chief carpets now in use are the following: *Brussels* carpets come from Brussels, Belgium, and are the most common in the United States and Europe. The back is of linen, and the face of raised worsted loops. These carpets are woven in simple patterns of not more than five colors. *Wilton* carpets, made in Wilton, England, are similar to Brussels in manufacture, except that the loops are cut open and sheared smooth so as to make a velvetlike surface. The *moquette* carpet, made in the United States, looks like the Wilton, but is made by fastening little tufts of woolen thread to a canvas back. The *ingrain* is an all-wool carpet, woven with two or three webs of different colors. It is smooth-finished on both sides and is usually reversible.

Though the Latin word *carpita,* from which *carpet* is derived, means *rug,* the terms are not synonymous to-day. Rugs are usually woven all in one piece and cover only part of a floor. They are rapidly replacing carpets wherever floors are of hardwood, because they are more artistic and more sanitary. See RUGS.

CAR'PETBAG'GERS, the name first given to Northern politicians who took up their residence in the Southern states after the Civil War in order to become representatives of those states in Congress and to control local politics. It was later especially applied to adventurers from the North who from 1865 until 1876 attempted to control the Southern states by becoming leaders of the colored voters. During this period the better class of whites was largely excluded from voting by the reconstruction measures of Congress. The state governments were administered by coalitions of unscrupulous whites and ignorant negroes, which levied heavy taxes, squandered public money in reckless extravagance and speculation and burdened the states with vast debts. These governments were known as carpetbag governments. See RECONSTRUCTION.

CARPET BEETLE, a small beetle sometimes called the *buffalo moth,* about one-eighth of an inch long, marked with black, white and red. The larva is a short, hairy grub that feeds on carpets and woolen clothing. It is a very destructive animal, and its extermination is often very difficult. Pyrethrum powder and naphtha balls are helpful. In homes where rugs and hardwood floors have supplanted carpets these bugs are not found.

CARPET SWEEPER, a device consisting of a roller brush inclosed in a dustpan, attached to a long handle. It is used to sweep floor coverings. In sections where electricity is available the carpet sweeper is being replaced by the vacuum cleaner.

CARRACCI, or **CARACCI,** *kah rah'che,* a family of Italian painters, founders of a school of art where the best features of all the great masters were emphasized. There were three members of the family who gained special renown, Ludovico (1555–1619), Agostino (1557–1602) and Annibale (1560–1609). Ludovico painted a number of religious canvases and sacred frescoes. Annibale chose not only religious subjects, but landscapes, examples of which are to be found in various European galleries. Agostino was both a painter and an engraver, winning distinction in both fields.

CARRANZA, *kah rahn'zah,* VENUSTIANO (1860–), a Mexican statesman, the leader of the counter-revolution which deposed Huerta. He belonged to the Mexican aristocracy and was a wealthy landowner and judge. A staunch supporter of President Madero, Carranza became leader of the former adherents of the deposed President when General Huerta overthrew the government, and in 1912 he was acclaimed First Chief of the Constitutionalists. After many months of civil war he became the real ruler of Mexico, and his position as such was formally recognized by the United States in October, 1915. Carranza proved to be unable to check lawless activities of the bandit Villa, but an expedition of United States troops into the country did not meet with his approval, and his opposition brought the two countries close to warfare (see MEXICO, subhead *History*). In March, 1917, he was legally elected President of Mexico, and was inaugurated on May 1. He succeeded in restoring to the republic a measure of order and quiet, but his attitude toward the United States was not wholly satisfactory. See VILLA, FRANCISCO.

CARRARA, *kah rah'rah,* **MARBLE,** a fine grade of crystalline limestone found in the mountains near the city of Carrara, Italy.

The stone is of a pure white color, and when polished has a beautifully smooth surface. It has been used to make many famous statues, and also provided the material for the Pantheon at Rome. About 10,000 men are employed in the quarries near Carrara, and though the mines have been worked for twenty centuries, there is no diminution in the supply.

The city of Carrara is in the northern part of the country, three miles from the port of Avenza, through which most of the marble is shipped. Population, 1911, 49,492 (including suburbs). See MARBLE.

CARREL, ALEXIS (1873–), one of the greatest biologists and surgeons of the twentieth century. Though born and educated for the profession of surgery in France, Dr. Carrel first attained world-wide renown through his experiments made at the Rockefeller Institution for Medical Research, in New York, where he began working in 1909. In 1912 he was awarded the Nobel Prize in medicine. Among his most important achievements are the surgical grafting of limbs, the transplanting of organs, such as kidneys, and the maintaining of life, growth and functional activity for protracted periods of time in organs and tissues apart from the body. In 1914, on the outbreak of the World War, he returned to France to give his services to the wounded, and as a result of his labors and those of his associates a new method for the sterilizing and healing of infected wounds was discovered. This process, known as the Carrel-Dakin treatment, was employed generally after the war in industrial surgery.

CARRIAGE, *kair'ij,* a wheeled vehicle, especially designed for carrying passengers. The important parts of a carriage are the body, seat, top, hood, dashboard, apron, step, springs, running gear, perch, forward gear, clip, fifth wheel, tongue, shafts, singletree, doubletree, axle and wheel. The essential parts of wheel are the hub, spoke, felloe and tire. The body of the carriage is usually made of hard wood. It is put together with mortises and tenons, held by screws and glue and strengthened with iron braces. The top in some carriages, as in the coach, is supported on wooden uprights; in others it is made of an iron frame, which can be folded or opened into a braced position. This frame is covered with leather or canvas. The gear is made of wood and iron. The hubs, felloes, spokes and shafts and the frame to which the axles are attached are of wood. The axles are of steel, and the hubs are fitted with steel boxes. In the most modern pattern of carriages the wheels revolve upon ball bearings. The fifth wheel is made of steel or iron and is the device upon which the forward axle operates. Modern carriages are manufactured in a great variety of styles, each of which has its own particular name, but all may be grouped under two classes—two-wheeled and four-wheeled.

CARRIER, COMMON. See COMMON CARRIER.

CARRIER PIGEON, *pij'un,* or **HOMING PIGEON,** a variety of the common domestic pigeon, so called because it can be trained to carry messages from and back to its home. Carrier pigeons are large birds with long wings, a large mass of naked skin at the base of the beak and a circle of naked skin around the eyes. Their speed is marvelous, and the distance through which they can fly without rest seems almost incredible. An American homing pigeon is known to have made a journey of 1,040 miles without stopping. These birds cannot be induced to fly away from home, and are teachable merely because of the strong instinct which tells them where home is and leads them to fly straight to it.

During the World War large numbers were trained to carry messages from different parts of the field of operations, and they were found to be a valuable supplement to the aeroplane and telegraph service. They fly at a height of about half a mile.

CAR'ROLL, CHARLES, of Carrollton (1737–1832), an American statesman of the Revolutionary period, born at Annapolis, Md. At the outbreak of the Revolution he was the wealthiest man in the colonies and used his influence and means freely for the aid of liberty. In 1776 he was elected to the Continental Congress from Maryland and signed the Declaration of Independence. He was again a delegate to Congress in 1777 and served on the committee which visited Valley Forge to investigate complaints about General Washington. In 1788 Carroll was elected the first Senator from Maryland under the Constitution of the United States, serving until 1791. He was the last surviving signer of the Declaration of Independence. He called himself "Carroll of Carrollton" to distinguish himself from others named Carroll.

CARROLL, Lewis. See Dodgson, Charles.

CARROT, *kair'ut,* a plant of the parsley family, whose slender, tapering root is widely used as a table and stock food. Carrots are grown from seed and belong to the biennial group; that is, their period of growth lasts through two seasons. They can be easily grown in a soil containing sand and clay, and they do not require much attention. The roots are white, reddish or yellow, but those cultivated for the table are smaller and of a finer grain than those intended for stock. Carrots are fed to dairy cattle, because they improve the quality of milk. As a table food they compare favorably with other vegetables, as they are nine per cent sugar. If cooked whole or cut into large pieces, carrots will lose less of their sugar content in boiling than otherwise. The plant contains a coloring matter sometimes employed in tinting butter. In some sections dried carrot is used as an adulterant of coffee.

CARROT

CARSON, Christopher (1809–1868), an American frontiersman, better known as "Kit Carson," was born in Madison County, Kentucky. In 1826 he began the adventurous life which made his name known everywhere in the West as the symbol of ingenuity and daring. In that year he accompanied a party of hunters to New Mexico, later went several times to the Pacific coast and acted as hunter for western army garrisons. He was with Fremont in several expeditions across the Rockies and also occasionally assisted western ranchers in driving cattle and sheep for long distances through the wild western country. Appointed United States agent to the Utah and Apache Indians in 1854, he performed notable service for the government, through his friendship with influential chiefs, and during the Civil War, as a scout in the southwest, he acted with great energy and skill in behalf of the Union, being brevetted brigadier-general at the close of the war. In cunning, quickness, resourcefulness and daring, he rivaled, if he did not excel, the most expert Indians.

CARSON, Edward Henry, Sir (1854–), a British statesman, the most active leader of the Irish party opposing Home Rule. Born in Dublin, and a graduate of the university in that city, he entered the British Parliament as member of the university in 1892, and from that time on was one of the most prominent figures in all matters pertaining to Ireland. Though prone to go to extremes, he was a brilliant debater. As the Home Rule question became more acute Carson stood out as the great leader of the Ulstermen in their opposition to the government program. When the Home Rule Bill finally passed Parliament, in 1914, the Ulstermen prepared to prevent its application by force of arms, with Carson at their head, but the outbreak of the World War postponed a settlement of the vexed problem. In 1915 Carson was appointed Attorney-General in the Asquith Ministry, but resigned in a few months. In December, 1916, when Lloyd George formed a new Cabinet, he was appointed First Lord of the Admiralty, but in 1917 he resigned to become a member of the War Cabinet without portfolio. In the spring of 1918, when the Irish question again reached a crucial stage, he gave up his third Cabinet position that he might not hamper the government in its attempts to deal with the problem. See Home Rule.

CARSON CITY, Nev., was founded in 1851 and was named for "Kit" Carson, the famous scout. It is on the Virginia & Truckee Railroad, thirty-two miles south of Reno. The city has been the capital of the state since 1861, and is the county seat of Ormsby County. There is a handsome capitol building; a Federal assay office is here which handles millions of dollars of bullion annually, and the city has one of the finest libraries in the West. There is also a large Federal building. The state prison is two miles from the city; and The Carson Indian School is three miles distant. Population, 1910, 2,466.

CARTAGENA, or **CARTHAGENA,** *kahrta je'na,* Colombia, a fortified seaport on the Caribbean Sea, capital of the state of Bolivar. The prominent buildings are a cathedral, a government building, a theatre and educational institutions. The place has manufactories of candles and chocolate, and carries on the export of cattle, hides, fine woods, tobacco and precious stones. Population, about 37,000.

CARTAGENA, or **CARTHAGENA,** Spain, a seaport in the province of Murcia, situated on a bay of the Mediterranean Sea. Its harbor, which is one of the largest and

safest in the Mediterranean, is sheltered by lofty hills. It is a naval and military station, the arsenal containing barracks, docks, hospitals and machine shops. Lead smelting is largely carried on, and there are in the neighborhood rich mines of excellent iron. Esparto grass, used in making cordage, is grown in the neighborhood. This grass and lead, iron ore, oranges and other fruits are exported. Among the buildings worthy of note are the Hospital Militar, the Presidio and the Gothic cathedral of the thirteenth century. Cartagena was founded by the Carthaginians under Hasdrubal about 243 B. C., and was called New Carthage. It was taken by Scipio Africanus (210 B. C.) and was long an important Roman town. Later it was ruined by the Goths but was revived in the time of Philip II. Population, 102,542.

CARTE BLANCHE, *kahrt blahNsh*, a word meaning *white paper*, is a blank paper authoritatively signed and entrusted to a person to fill up as he pleases. Thus, in 1649 Charles II tried to save his father's life by sending from the Hague to the Parliament a signed *carte blanche*, to be filled up with any terms which they would accept as the price of his safety. In 1832 Earl Grey was said to have been armed with a *carte blanche* for the creation of new peers. The term is now used figuratively to mean a gift of unlimited powers.

CAR'TERET, GEORGE, Sir (?–1680), an English loyalist whose name is associated with the colonial history of New Jersey. When the Civil War broke out in England between Charles I and Parliament, Carteret took the side of the king and served in the navy; after the Parliament had triumphed, he joined the French navy. Charles II, on his restoration, rewarded him and gave him, in company with Lord Berkeley, the territory which was given the name of New Jersey, in America. When, about ten years later, it became necessary to divide the territory, Carteret received East Jersey for his share. See NEW JERSEY, subhead *History*.

CAR'THAGE, an ancient and celebrated city on the northern coast of Africa, the people of which waged three wars with Rome between 264 B. C. and A. D. 149. According to an old legend, Carthage was founded by Dido, a Phoenician queen, in 878 B. C., but it is more probable that it was founded about 850 B. C. by Tyrian merchants, as a trading post. It was situated about twenty miles south of Utica and near the site of modern Tunis. The city was built on a peninsula about three miles wide, across which was a triple wall of towers. All the sides were defended by walls, and a double harbor served for merchants' ships and for the navy. At its height, Carthage had a population probably greater than that of Rome, amounting, it is said, to 700,000, and it also had the largest navy in the world.

The Carthaginians gradually acquired dominion over the other Phoenician colonies of northern Africa and over the neighboring tribes, and the city soon became one of the greatest of commercial centers. Early in the sixth century B. C. the Carthaginians were allies of the Phoenicians, who in Sicily were crowded by the Greeks. After checking the Greeks, they reduced the coast of Sardinia, founded colonies there and gained control around the western Mediterranean and in Spain. Their first wars of importance were with the Greeks in the fifth century B. C., over the control of Sicily. The results were successes on each side and the final abandonment of the island by the Greeks. Rome was in the meantime conquering Southern Italy, and thus the two nations were brought together. The wars which followed are called the Punic Wars (see PUNIC WARS). In 149, Rome, after a desperate siege of two years, captured the city and destroyed it by fire.

The Emperor Augustus rebuilt Carthage in 29 B. C., and the new city became one of the finest in the Roman Empire, but to-day there are no remains of it but a portion of its wall. It was destroyed once for all by the Arabs in 647.

CARTHAGE, Mo., founded in 1833 but destroyed during the Civil War and afterwards rebuilt, is the county seat of Jasper County, 150 miles south of Kansas City, on the Saint Louis & San Francisco, the Missouri Pacific and the Carthage & Western railroads. The industries largely center in lead, zinc and quarrying; there is an important shoe factory. A Federal building was erected in 1911 at a cost of $75,000, and there is a Carnegie Library and a public hospital. The commercial clubroom is a unique institution, serving as a meeting place and rest and recreation center for everybody for miles in each direction. The site of the battle of Carthage, in the Civil War, is a public park. Population, 1910, 9,483; in 1917, 9,531 (Federal estimate).

CARTHUSIANS, *kahr thu'zhanz,* an Order of monks founded in the eleventh century by Saint Bruno of Cologne, who with six companions went to the village of Chartreuse in the Alps, far above sea level, and built a small convent, donned coarse garments and lived as hermits. The members of the Order fast frequently and eat no flesh or fish except what is given them. They usually have one meal a day, and this consists of bran bread. The dress is white, except a long black cloak and hood worn outside the monastery. The Carthusians were, from the beginning, well educated and given to hospitality and charity. At one time they had the finest convents in the world, of which La Grande Chartreuse, in France, and the Certosa di Pavia, south of Milan, are among the most celebrated. They originated the famous liquor *chartreuse.*

CARTIER, *kahr tya'* Georges Etienne, Sir (1814–1873), a Canadian statesman. He was born at Saint Antoine, Quebec, and was graduated in law at the College of Saint Sulpice, in Montreal. Cartier was called to the bar in 1835 and gained a large practice. He took an active part in the rebellion of 1837, headed by Louis Papineau, but gradually changed his views so that after his election to Parliament in 1848 he soon became an acknowledged leader of the more liberal wing of the Conservatives. In 1855 he was appointed provincial secretary and two years later attorney-general for Lower Canada. From 1857 to 1862 Cartier was joint Premier of Canada with Sir John A. Macdonald. He took a prominent part in progressive legislation, such as the abolition of seigneurial tenure, the reform of civil law, and the development of the Grand Trunk Railway. He carried Quebec into the Confederation against great opposition and served till his death as Minister of Militia and Defense in Macdonald's first Cabinet.

SIR GEORGES CARTIER

CARTIER, Jacques (1494?–1557), a French navigator who commanded an expedition to North America in 1534, entered the Straits of Belle Isle and took possession of the mainland of Canada in the name of Francis I. He subsequently went to found a settlement in Canada and built a fort near the site of Quebec, but it was soon abandoned. It was Cartier's exploration upon which France based its claim to the mainland of Canada.

CARTILAGE, *kahr'ti laj,* or **GRISTLE,** *gris''l,* a pearly white, firm and very elastic tissue, occurring in vertebrate animals. When cut, the surface contains no visible cells, cavities or pores. It enters into the composition of those parts which must be firm yet easily bent. *Temporary cartilages* are substitutes for bone in the earlier periods of life, and they finally become bone. The extremities of the long bones at birth are cartilage. A good illustration of a temporary cartilage is found in the breast-bone of a chicken. The *permanent cartilages* are attached to the extremities of bones in the formation of a joint, are found in the external ear, aid in forming the nose and are the foundation of the eyelids, the trachea and the larynx.

CARTOON', a term used at the present time to designate a picture intended to ridicule some notable character, party, belief or movement, or to emphasize by means of a pictorial sketch some important event. *Cartoon* has thus come to mean about the same as *caricature* (which see).

Originally the term was applied to a drawing made on heavy paper or cardboard, and used as a model for a large picture in fresco, tapestry or oil color. The cartoon is made exactly the size of the picture intended, and the design is transferred to the surface to be ornamented by tracing or other processes. The most famous cartoons are those painted by Raphael for the Vatican tapestries. Originally there were twenty-five, but they were neglected and changed hands so many times that now only seven remain, and these are at the South Kensington Museum, London. Some of the subjects represented are *Paul Preaching at Athens, The Miraculous Draught of Fishes, The Death of Ananias* and *The Sacrifice at Lystra.*

CARTOUCHE, *kahr toosh',* a term applied to a tablet used for ornament or for receiving inscriptions, generally in the form of a scroll unrolled. In Egyptian architecture, cartouches were the oval or elliptical figures carved on monuments and temples to receive hieroglyphic inscriptions of different kinds. In heraldry the term denotes a kind of oval

shield, much used by the Popes and princes in Italy, and others, both clergy and laity.

In later usage the word signified a roll of paper or other material which held a charge of powder; the term *cartridge* is a corruption of *cartouche.*

CARTRIDGE, *kahrt'rij.* For civilian use a cartridge is a cylindrical case of metal suited to the bore of a gun and filled with a charge of powder. The bullet fits tightly into the open end. The charge is exploded by a primer, in the center of the flat, closed end. Cartridges for great guns are in bags and contain only the powder. The first cartridge cases for rifles were made of copper, and the practice yet continues to some extent, but brass is now generally employed, and is made in one piece, with a solid head.

A *blank cartridge* has powder only, and while the explosion is as loud as though it contained a bullet it is harmless except for danger of powder-burns at close range.

CARTWRIGHT, Edmund (1743–1823), an English inventor whose fame rests on his contributions to the art of weaving. At the age of forty he turned his attention to mechanics, and in 1785 he brought his first power loom into action. Although much opposed both by manufacturers and workmen, this loom made its way and in a developed and improved form is now in universal use. He also invented a wool-carding machine, a rope-making device and a steam engine which burned alcohol. Cartwright received a grant of $50,000 from Parliament in 1809. See Loom; Weaving.

CARUSO, *ka roo'zo,* Enrico (1873–), an Italian operatic singer, born in Naples. As a boy he sang in churches, and he began systematic study at the age of eighteen, under Guglielme Vergine. Upon completion of his study he began at once his operatic career, singing in the principal cities of Europe, and appearing in America first in 1903, in New York City. There he won almost instant success, becoming the most celebrated tenor of the day. Since that time he has visited America professionally nearly every year. Caruso's popularity is due to a voice of remarkable power, sweetness and range. In dramatic ability he is distanced by his celebrated contemporary, Muratore, but he has never failed to charm his audiences. Caruso's talking-machine records bring prices as high as seven dollars. In 1918 he appeared in moving pictures.

CAR'VER, John (1575–1621), the first governor of Plymouth Colony, in the New World. He was born in England and went to Leyden, then a refuge for the Puritans. He was an elder in the church and in 1620 sailed with the Pilgrims in the *Mayflower,* being unanimously elected governor before the landing. Carver was a prudent and firm ruler. He died at Plymouth the April following his arrival, from the effects of a sunstroke. See Plymouth Colony.

CARV'ING, as a branch of sculpture, the process of cutting a hard body, usually ivory or wood, into some particular shape by means of a sharp instrument. This art was common in ancient times among the Babylonians, who carved ivory and practiced gem engraving to a considerable extent. In early ages statues of the gods were made of wood, painted, and clothed with colored draperies. Carving in both ivory and wood became general for the decoration of the early Christian churches. During the last part of the Middle Ages, the art of wood carving was brought to a high degree of perfection in Germany, where it was practiced especially in the decoration of shrines and altars. The carving was very elaborate, sometimes representing whole scenes from well-known legends of the saints. In most countries of Europe the art has been largely displaced in recent times by molded work of various kinds and by metal casting, but wood carving has retained its importance in Switzerland.

CARY, *ka'ri,* Alice (1820–1871) and Phoebe (1824–1871), two sisters, writers of poetry of the reflective and sentimental type. Born on a farm in Ohio, and enjoying only the meager privileges of a rural school education, these sisters nevertheless kept their ideals high, and in early womanhood they were writing verses for local papers. They were encouraged by Whittier and Horace Greeley to try a broader field, and in 1851 they removed to New York. There they remained for twenty years, companions until their death. The poetry of the Cary sisters is still read and loved, though they have not quite the vogue they attained in their own day. Phoebe is probably best remembered for her appealing hymn *Nearer Home,* beginning—

> One sweetly solemn thought
> Comes to me o'er and o'er—
> I am nearer home to-day
> Than I ever have been before.

Alice, who had more delicacy of imagination, but less wit and animation than her sister, wrote one lyric that was warmly praised by no less severe a critic than Edgar Allan Poe. This is her *Pictures of Memory*. The poems of the Cary sisters have been published together. The best biography of the poets is *A Memorial of Alice and Phoebe Cary*, by Mary C. Ames.

CARYATIDES, *kari at'i deez*, or **CARYAT'IDS**, the name applied in Greek architecture to the figures of women dressed in long robes, standing upright in graceful positions and used as columns to support a roof. The most celebrated of these figures appear on the southwest porch of the Erechtheum, Athens. The corresponding male figures are called *Atlantes*.

CASABA, *kah sah'bah*, **MELON**, a large kind of muskmelon, so called because it came originally from Cassaba, in Asia Minor. Its flesh is yellow and of a very agreeable flavor. On the outside the Casaba melon has lengthwise grooves, as have other muskmelons, but it lacks the network of lines seen on the ordinary varieties. Casabas are now common in American markets, but their popularity is of comparatively recent date.

CASABIANCA, *kah zah byahng'kah*, the boy hero of the Battle of the Nile, whose name has been perpetuated in a poem by Felicia Hemans. Its opening lines are well known because they have been so often parodied:

> The boy stood on the burning deck,
> Whence all but him had fled—

but nevertheless the poem relates the story of a real Casabianca, the ten-year old son of the captain of the *Orient*. This ship was the flagship of Napoleon's fleet. During the battle the commanding admiral was killed, and the captain of the *Orient* took charge. He told his little son to remain on deck until he was given permission to leave, and the lad remained when everyone had fled because his father lay wounded and unconscious. Father and son perished in an explosion which destroyed the vessel.

CASCADE, *kas kade'*, RANGE, a range of mountains in the United States, British Columbia and Alaska, near the Pacific coast, to which it is parallel, extending from the Sierra Nevada range, in California, northward to Alaska. In the United States, the Columbia and Klamath rivers cut their way through these mountains to the sea, forming deep gorges or canyons noted for the beauty of their scenery. The range contains several active volcanoes. The highest peaks are Mount Shasta, 14,510 feet; Mount Rainier or Tacoma, 14,444 feet; Mount Adams, 12,490 feet, and Mount Hood, 11,225 feet. These mountains are of volcanic origin, and the highest peaks are extinct volcanoes.

CASCADE TUN'NEL, a tunnel on the Great Northern Railroad through the summit of the Cascade Mountains, in Washington. The length is 13,413 feet, or 2.6 miles. This is prolonged by extending the lining 200 feet at each end, to take the place of snow sheds. The width is sixteen feet, and the height is twenty-one feet six inches. The lining is of concrete and varies in thickness from twenty-three inches to three feet six inches.

CASCARA, *kas'ka ra*, a fluid extract of the cascara buckthorn, or California buckthorn. It is employed with other laxatives by physicians for the relief of constipation. It is nearly always one of the ingredients of so-called liver pills.

CASCARILLA, *kas ka ril'la*, a term applied to several different medicinal barks, but used most often to designate the bark of a small shrub found on the Bahama Islands. From this bark is prepared a medicine used in some cases of dyspepsia, chronic bronchitis and certain fevers. It has the effect of increasing the flow of the digestive juices, but if taken in too large quantities it is nauseating.

CASCO BAY, a bay of Maine, between Cape Elizabeth on the southwest and Cape Small Point on the northeast. Within the bay are more than 300 small islands, most of which are very fertile; almost all are occupied by summer residences. Portland is situated on the west side of the bay, which forms one of the best harbors on the Atlantic coast.

CASEIN, *ka'se in*, that substance in milk which is coagulated by the action of acids, and which constitutes the chief part of the nitrogen contained in it. Cheese made from skimmed milk and well pressed is fully half casein. Casein is one of the most important elements of animal food found in milk and such plants as beans and peas. It consists of carbon, hydrogen, nitrogen, oxygen and sulphur.

CASHMERE, *kash meer'*. See KASHMIR.

CASHMERE GOAT, a variety of goat found in Tibet and India, remarkable for its fine, silky fleece. From the fleece is made the costly cashmere (or kashmir) shawl, formerly a garment of fashion in America. The colder the region where the goat pastures, the heavier is its fleece. A full-grown goat yields not more than eight ounces of the valuable down which underlies the long hairs. A large shawl of the finest quality requires five pounds, and one of the inferior quality requires from three to four pounds. The flesh of the cashmere goat is suitable for food, and when well cared for the animal gives a rich milk. These goats have been successfully introduced into France and Germany. See GOAT.

CASH REGISTER, a machine for recording the cash received for sales in retail stores. It consists of a metallic box, with keys arranged similarly to those on a typewriter, each key representing an amount purchased, from one cent up to from one to five dollars, depending upon the size of the machine. When the amount of the purchase is beyond the limit of the machine, it can be registered by pressing two or more keys at once. When the key is pressed, it throws a tablet, showing the amount of purchase, into such a position that it can be seen both by the customer and the salesman, and at the same time it opens the cash drawer. It also registers the amount purchased on a long roll of paper, turned forward by a system of wheelwork that is under lock and key. The amount of the day's sales is determined by adding the various amounts registered on this roll. Calculating attachments are now commonly employed in cash registers. These machines cost from $50 to $750. See CALCULATING MACHINES.

CASIMIR-PERIER, *ka ze meer' pa rya'*, JEAN PAUL PIERRE (1847–1907), a French statesman, President of the republic from 1894 to 1895. He was trained for a political career, but during the Franco-German war greatly distinguished himself, receiving the cross of the Legion of Honor. In 1874 he was elected to the Chamber of Deputies, and three years later he entered the Cabinet as Under-Secretary of State. He formed a Ministry in 1893, but it was of short duration. On the assassination of Carnot in 1894, he was elected President of the French republic, but he resigned in less than a year.

CASINO, *kas se'no*, another spelling for CASSINO (which see).

CASPIAN, *kas'pi an*, **SEA**, the largest interior body of water on the globe, lying ninety-six feet below sea level, on the border between Europe and Asia. It is bounded on the east by Persia, and on the other three sides by Russian territory. The Caspian has an area of about 170,000 square miles, over five times that of Lake Superior, and is fed by several large rivers, including the Volga, the Ural and the Kura. It abounds in shallows, making navigation difficult. The water is less salt than that of the ocean, is of a bitter taste and of an ocher color. Astrakhan and Baku are the chief cities on its shores. During the World War the country along the western shore of the Caspian was overrun by the Turks; the city of Baku was demanded both by Germany and Turkey as one of the spoils of war, when the Central empires were confident of winning the war.

CASS, LEWIS (1782–1866), an American statesman, one of the builders of the Middle West. He became brigadier-general of the regular army during the War of 1812, and in 1813 was appointed governor of the territory of Michigan. During seventeen years of service he laid the foundations of American civilization in the country under his control by his far-seeing policies and good judgment. General Cass became Secretary of War under Jackson in 1831, served as Ambassador to France from 1836 to 1842, and in 1845 was elected United States Senator from Michigan. It is an interesting fact that the first definite mention of squatter sovereignty (which see) occurs in a letter of his, dated in 1847. Cass served as Secretary of State in Buchanan's Cabinet, but resigned in 1860 because the President refused to safeguard Federal interests in the South. He was an aspirant for the Presidency in 1848, but was defeated by Taylor the hero of the Mexican War.

CASSANDRA, *ka san'dra*, in Greek legend, a daughter of Priam and Hecuba. She was endowed by Apollo with the gift of prophecy, but when she refused to accept his love, he became angry, and because he could not take from her the gift which he had bestowed, he ordained that no one should believe her prophecies. She frequently foretold the fall of Troy and warned her countrymen against the stratagem of the Wooden Horse (which see). No attention, however, was paid to her warnings. In the drama *Agamemnon*, written by Aeschylus, the

prophetess is carried away to Greece by Agamemnon and murdered there by Clytemnestra, the wife of Cassandra's captor.

CASSAVA, *ka sah'vah,* a South American shrub, from the starchy root of which is obtained the tapioca of commerce. The plant grows about eight feet in height, and bears broad, shining, hand-shaped leaves, and beautiful white and rose-colored flowers. There are two species of cassava, bitter and sweet, but the roots of both are valuable. From bitter cassava is obtained a juice used in making a sauce called casareep. The shrub is cultivated in the West Indies, Florida, Central America and other tropical regions. In South America it is known as *manioc* and *yuca.* See TAPIOCA.

CASSEL, or **KASSEL**, *kahs'sel,* GERMANY, under the Empire until 1919 the capital of the province of Hesse-Nassau, Prussia, on the Fulda River, ninety-one miles north-northeast of Frankfort-on-the-Main. Cassel is one of the most beautiful towns of its size in Germany. There are numerous fine buildings and educational and charitable institutions, and the municipal art gallery possesses a collection of rare value. The city has manufactures of machinery, mathematical instruments, iron wares, chemicals, knives, gloves, leather and porcelain. Population, 1914, 163,749.

CASSIA, *kash'ah,* a large genus of plants belonging to the pea family and found in the tropical parts of the world. The cassias consist of trees, shrubs or herbs. The leaves, which are compound, usually bear glands on their stalks. The leaflets of several species constitute the well-known drug called senna, and both leaves and flowers are used as medicines. *Cassia bark* is a common name for the bark of an entirely different plant, belonging to the laurel family. Its flavor resembles that of cinnamon, and as it is cheaper it is often substituted for it. The cassia of the Bible was probably cassia bark.

CASSINO, or **CASINO**, *kas se'no,* a simple game played by two or more persons with a full pack of cards. The cards are dealt one at a time to each of the players and to the center of the table, in succession, until four have been dealt to each. Those on the table are turned face up. The player at the left of the dealer begins by taking from the table any cards that have the same value as one in his hand; or he may take any number of cards, the sum of whose spots equal any card in his; as, an eight will take all other eights, a six and a two, a five and a three, a three and a three and a two or any combination that makes eight. The player can play but one card in his turn, and if he can take none with it, he lays it upon the table, face up. He may, however, *build;* for example, if there is a two on the table and he has a three in his hand, he may lay this three upon the two and call five, providing he has in his hand a five with which to take the pile at his next turn. He may also build a pair upon the table, providing he has a third card of the same denomination with which to take the pair.

An opponent may build from his hand on any pile excepting a pair. When the four cards have been played in rotation, four more are dealt to each player, and so on until the pack is exhausted. When all the cards have been played to the table, the one who takes the last "trick" has also the cards that remain. The points that count are Little Cassino (the two of spades), 1; Big Cassino (the ten of diamonds), 2; each ace, 1; the greatest number of cards held by a single player, 3; the greatest number of spades held by a single player, 1. If at any time a player can take all the cards from the table, except in the last hand, it is called a *sweep* and counts 1 to the player. The usual game is 21 points.

CASSIOPEIA, *kas i o pe'yah,* a bright constellation in the northern hemisphere, often called the "Lady in her Chair." It contains fifty-five stars, five of which, arranged in the form of a W, are of third magnitude. For the myth concerning Cassiopeia, see the article ANDROMEDA.

CASSIOPEIA

CASSIT'ERITE, an ore of tin, from which most of the metal is obtained. It consists of seventy-nine parts of tin and twenty-one parts of oxygen. Cassiterite is found in

Cornwall, England; Saxony; the Malay Peninsula; at Banca, Australia; and in Mexico and the United States. See TIN.

CASSOWARY, *kas'o wa ri,* a large bird belonging to the same family as the ostrich and emu, a native of New Guinea. The bird stands about five feet high. Its peculiar

CASSOWARY

feathers hang down its sides, resembling long hair, its head and neck are bare and bluish in color, and its head is crowned by a bony crest of brilliant blue, scarlet and purple. The wings of the cassowary are so short that it is unable to fly, but its legs are powerful and it can run with great speed. To the natives it is a valuable bird, as it can be domesticated, and they use its plumage for head decorations, rugs and mats. Its flesh is edible.

CAST, in art, a representation or impression of a statue, bust or other model, by means of wax, plaster of Paris or some other substance. The model is covered with the plaster, so applied as to form a kind of shell over the surface, and is divided into sections which can be removed, one at a time. The different sections are put together when dry and form the mold; the mold is filled with liquid plaster, which soon hardens and is a reproduction of the model. See SCULPTURE.

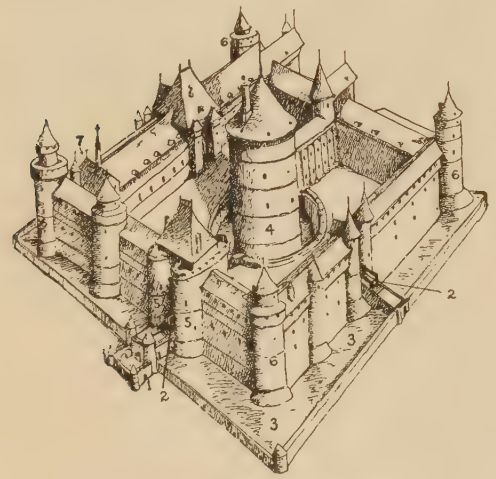
CAS'TANETS, a musical instrument composed of two small concave shells of ivory or hard wood, shaped like spoons. When played the shells are placed together, fastened to the thumb and beat with the middle finger. This instrument is used by the Spaniards and Moors as an accompaniment to their dances and guitars.

CASTE, meaning *breed* or *race,* is a term applied to a class or section of a people who are marked off from others by certain restrictions, and whose burdens or privileges are hereditary. It was originally applied to the classes in India whose occupations, customs, privileges and duties are hereditary. It is probable that caste was originally grounded on a difference of descent and mode of living, and that the separate castes were originally separate races. It now prevails principally in India, but it is known to exist or to have existed in many other regions. See BRAHMANISM.

CASTILE, *kas teel',* an ancient kingdom of Spain which formerly occupied a large part of what is now the Spanish peninsula, extending southward from the Bay of Biscay. Castile is interesting because of its historical associations. It was the ancient kingdom which formed the nucleus of the Spanish monarchy. In the latter part of the fifteenth century Isabella, heir to the throne of Castile, married Ferdinand, king of Aragon, and the two kingdoms were at first nominally and then formally united. Castile was one of the strongest states in the conflict with the Moors, and it was largely due to its military strength that these people were expelled from Europe. Isabella and Ferdinand were the two monarchs who sent Columbus on the expedition which discovered America.

CASTLE, *kas''l,* an edifice serving at once as a residence and as a place of defense. The castles erected by the feudal lords and princes of the Middle Ages were wonderful structures, able to resist the strongest attacks. The imposing ruins of castles of this kind are still to be seen in England, Germany and France. Where the country permitted it, the castle was located on the top of a hill or on the summit of a lofty and inaccessible crag, and where there were only level lands it was surrounded by a moat or ditch that sometimes comprised several acres, across which a drawbridge was hung so that it could be raised in times of defense. Behind it was the outer wall, generally of great height and thickness, strengthened with towers at regular distances and pierced with loopholes through which missiles could be discharged at the assailants.

The main entrance through the outer wall was protected by the *barbican,* with its narrow archway and strong gates, and the *portcullis,* raised and lowered by chains and weights. Inside there were usually an outer and an inner court, and the strong, more or less detached building known as the *keep,* also called the *dungeon* or *donjon,* which formed the residence of the owner and his family. This was the most strongly constructed of all the buildings, to which the defenders retreated only in the last extremity. The walls were all strengthened by towers, either circular, square, oblong or many-angled, projecting both outward and inward. Such towers were capable of being defended independently of the castle. The invention of gunpowder was the doom of the castle, and now only a few remain habitable.



DETAILS OF A CASTLE
1. Fortified approach
2. Drawbridge
3. Moat
4. Donjon or keep
5. Towers flanking main entrance
6. Angle towers for defense of outer wall
7. Chapel

CASTLE, EGERTON (1858–), an English novelist. In collaboration with his wife, Agnes Castle, he has written a number of stories which have a wide appeal because of their delightful blending of romance and adventure. Castle was educated at the universities of Paris, Glasgow and Cambridge, and at the Royal Military College, Sandhurst. He saw service in India, and later utilized his experiences there to provide a background for some of his stories. He has written, among other novels, *Consequences, The Light of Scarthey* and *Young April.* The books written in collaboration with his wife include *The Pride of Jennico, The Bath Comedy* (dramatized as *Sweet Kitty Bellairs*), *Rose of the World* (dramatized for moving pictures with Elsie Ferguson as the star), *The Ways of Miss Barbara, A Little House in War Time* (1915), *Wind's Will* (1916), *The Black Office* (1917) and *Wolf Lure* (1917).

CASTLE GAR'DEN, a large building in Battery Park, in New York City. It served first as a fort, and then it was used as a public hall for assemblies and concerts. Jenny Lind made her début in America here. In 1855 Castle Garden became the landing place for immigrants. In 1890 it was given to the city and has since been used as a public aquarium. See AQUARIUM.

CASTOR AND POLLUX, in Greek mythology, twin gods, the sons of Zeus and Leda, known also as the Dioscuri, which means *sons of Zeus.* Helen of Troy was their sister, and they figured in her rescue when Theseus carried her away to Athens. Pollux was immortal, and when his mortal brother was killed in battle, he begged to be allowed to give up his own life for his brother's. Zeus, moved by this devotion, permitted the brothers to spend alternate days on earth and in the lower world.

CASTOR OIL, the oil obtained from the seeds of the castor oil plant. It is a native of India, but is now distributed over all the warmer regions of the globe. The oil is obtained from the seeds by bruising and pressing. That which first comes away, called cold-drawn castor oil, is considered the best. The castor oil of commerce, which is used as a purgative, is chiefly imported from India. The taste of castor oil is very disagreeable, and can be swallowed without a feeling of nausea only when it is enclosed in a capsule or within a small piece of fruit. This plant is often cultivated in gardens for ornament.

CASTOR OIL PLANT

CAT, the name of the commonest of the household pet animals, is also applied to the family to which the cat belongs. This family includes the fiercest wild animals known, including the lion, tiger and panther. It is believed that the cat was originally domesticated in Egypt, where it was loved and venerated. The domestic cat belongs to a genus better armed for destruction of animal life than any other quadrupeds. The short and powerful jaw, sharp, pointed teeth, sharp claws and strong muscles make it a fierce enemy of birds and other small animals. Birds have no greater enemy, and one cat often drives the beautiful, friendly singing birds from a whole neighborhood. The cat is usually regarded as less intelligent than the dog, but possibly it has equal intelligence of another kind. It seems to have little real affection for mankind, though it enjoys being petted and shows signs of jealousy if neglected. It does become strongly attached to places, and it often will desert its friends who have removed, and return to the strangers who occupy its old home.

Among the various breeds or races of cats, the *tailless cat* of the Isle of Man, and the *Persian cat*, with its long, silky fur, are among the most curious. The *tortoise shell*, with its color a mixture of black, white and brownish or fawn color, the large *Angora* and the *blue*, or *Carthusian*, and *Maltese* cats, with long, soft, grayish-blue fur, are other well-known species. See ZOOLOGY.

SOME MEMBERS OF THE CAT FAMILY

1. Cat. 2. Jaguar. 3. Lynx. 4. Lion. 5. Tiger.

CATACOMBS, *kat'a kohmz*, caves or subterranean places for the burial of the dead, the bodies being placed in graves or recesses hollowed out in the sides of the cave. Caves of this kind were common among the Phoenicians, Greeks, Persians and many Oriental nations. In Sicily and Asia Minor numerous excavations have been discovered, containing sepulchers, and the catacombs near Naples are remarkably extensive. The term is said to have been applied originally to the district near Rome which contains the chapel of Saint Sebastian, in the vaults of which, according to tradition, the body of Saint Peter was first deposited; but usually, in speaking of the catacombs, we mean those subterranean

burial places just outside the walls of Rome, which were made by the early Christians. They consist of long, narrow galleries, usually about eight feet high and five feet wide, which branch off in all directions, forming a perfect maze of corridors. When one story of them was no longer sufficient, staircases were made, and a second line of galleries was dug out beneath. The graves, or *loculi,* were cut into the walls of the gallery, one above another, to receive the bodies. They were closed laterally by a slab, on which there was occasionally a brief inscription or a symbol, such as a dove, an anchor or a palm branch, and sometimes all of these.

The decorations have given us our chief information concerning art during the first four centuries of the Christian Era. Some of the inscriptions and epitaphs are beautifully carved, some are merely scratched upon the slab and others are painted in red and black. In later times beautiful frescoes were common, in which are indicated the Christian faith and devotion. It is now regarded as certain that in times of persecution the early Christians frequently took refuge in the catacombs, since burial places had the right of protection by law, and gathered there to celebrate in secret the ceremonies of their religion.

The term has also been applied to certain ancient subterranean quarries in Paris, which have been used since 1786 as burial places. It is said that six million bodies lie in these catacombs, where the bones are arranged in fanciful designs along the sides of the passages.

CAT'ALEPSY, a condition in which a person suddenly becomes unconscious and remains rigidly fixed in the attitude which he had assumed when the attack seized him. The attack may terminate quickly or it may continue for some time; the latter is liable to be the case when insane persons are attacked. The action of the heart and lungs continues, and the pulse and temperature remain natural. Catalepsy is generally the consequence of some other disease.

CATALINA, *kat a le'na,* **ISLAND,** an island of the Santa Barbara group, near Los Angeles, Cal., containing 47,000 acres. Tourists visit it in large numbers because of the fine climate and the beautiful submarine gardens off its shores. Visitors are rowed about in glass-bottomed boats, through which they may look upon all sorts of fish and seaweed of varied hues and fantastic form. The island is about twenty miles long and from one to nine miles wide. Its surrounding waters have been made a fish reservation by act of the California legislature, and there the development of the tuna fishing industry has assumed great importance.

In 1919 the island was purchased by the manufacturer of a popular brand of chewing gum, for $3,000,000. He announced that he would spend other millions to make it the world's greatest pleasure resort.

CATALPA, *ka tal'pa,* a desirable shade tree of rapid growth, with large, gay, trumpet-shaped flowers of a distinctive odor. Pods, nearly a foot long, follow the flowers and sometimes remain on the trees throughout the winter. Some species of catalpa are natives of Japan and China, while others belong to the United States and Southern Canada. The wood is used in making railroad ties and fence posts.

CAT'AMOUNT, the wild cat. The name is also given to the tiger and the puma. See WILD CAT.

CATANIA, *ka tah'ne a,* a city on the east coast of Sicily, in the province of Catania, at the foot of Mount Etna, fifty-nine miles southwest of Messina. It has been repeatedly visited by tremendous earthquakes, one of the worst of which was in 1693, when it was almost entirely destroyed; and it has been partially laid in ruins by lava from eruptions of Mount Etna. The city was one of the most flourishing of Greek cities in Sicily and was important under the Romans. The ruins of the amphitheater, which was more extensive than the Colosseum at Rome, are still to be seen, as are the remains of the theater, baths, aqueducts, sepulchral chambers, hippodrome and several temples. Catania has a considerable trade, and it manufactures silk and other fabrics, besides lava and amber ware. It exports grain, fruits, sulphur and wine. Population, 1911, 211,699.

CATAPULT, *kat'a pult,* a weapon used in ancient times for the purpose of throwing heavy stones, iron bars and similar missiles. It operates on the same principle as the crossbow or the boy's slingshot (see SLINGS). There was a revival of the old weapon during the World War in the use of various devices for hurling poison-gas bombs, grenades, etc.

CATARACT, *kat'a rakt,* a disease of the eye, in which the crystalline lens, or its cov-

ering, becomes opaque. Impairment of the vision, ranging to complete blindness, results. The earliest approach of cataract is marked by a loss of the natural color in the pupil, which, as the disease progresses, appears to have a milk-white or pearly color. Cataract is most common in elderly people and is quite painless. It is treated by different surgical operations, all of them consisting in removing the diseased lens from its position opposite the transparent cornea. No medical treatment is successful. See EYE.

CATARACT, or **WATERFALL**, the descent of a stream over a ledge or precipice occurring in its course. The terms *cataract, waterfall, cascade* and *rapids* are often used to designate the same thing, but the following distinction may be made: If the volume of water is large, as at Niagara, the fall is a *cataract;* if the volume is small, the fall is a *cascade;* slight falls of a few feet, like those in the Saint Lawrence River, are called *rapids.* All of these forms are waterfalls.

A cataract is caused by a harder layer of rock, which does not wear away as rapidly as the formations below. The river gradually wears down the channel below this obstruction, and this creates a rapid or fall, according to the nature of the formation and the slope of the bed. In case of a deep, narrow channel worn below the projecting rock, a waterfall with nearly vertical descent is the result, like the falls at Niagara and Victoria Falls in the Zambesi Africa. When a series of obstructions occurs, one below the other, rapids are formed. Cataracts are most numerous in mountain streams, where many of them are of great height and of remarkable beauty. The largest cataracts in the world are Victoria Falls in Africa, which are about a mile wide and nearly 400 feet high; Niagara Falls, which have a width of over 4,000 feet and a height of 160 feet; and the Iguassu Falls in South America, 180 feet high. See NIAGARA FALLS; VICTORIA FALLS; IGUASSU FALLS.

CATARRH, *ka tahr'*, an increased secretion of mucus from the membranes of the nose, throat, bronchial tubes or other parts of the body. Catarrh, as popularly recognized is a disease of the nasal passages, throat or bronchial tubes only, but it is known by physicians to result wherever the mucous membrane becomes inflamed, whether caused by exposure to cold, the breathing of impure air, constipation or other agency. Catarrh of the nasal passages should never be neglected, for it is a common cause of impaired sight and hearing.

CATAWBA, *ka taw'ba,* a tribe of Indians that formerly inhabited North and South Carolina. Pontiac was a descendant of the Catawbas. These Indians were friendly to the Americans in the Revolution, and were very hostile to the Iroquois and other tribes of the north. Only a handful of Catawbas remain; they are found on a reservation in York County, South Carolina.

CATAWBA RIVER, or **GREAT CATAWBA RIVER**, a river in North Carolina, rising in the Blue Ridge. Below Rocky Mount, S. C., the stream is called the Wateree. The Catawba is about 250 miles long.

CAT'BIRD, a common American thrush, so named because one of its calls sounds like the mewing of a cat. It is found throughout the Northern and Middle states, in thickets and shrubberies, where it lives an active

CATBIRD

existence, chiefly in the pursuit of insects. Its plumage is a deep slate color above and lighter below, with a reddish-brown patch on the lower tail coverts. Its song is varied and fine, largely in imitation of the songs of other birds. In winter it retires to the extreme southern parts of the United States, or even to Mexico and Central America.

CATECHISM, *kat'e kiz'm,* an elementary book containing a summary of principles in any science or art, but particularly in religion, reduced to the form of questions and answers. The first regular catechisms appear to have been compiled in the eighth and ninth centuries, those by Kero of Saint Gall and Otfried of Weissenburg being most famous. Among protestants the catechisms of Luther (1518, 1520 and 1529) acquired great celeb-

rity and continue to be used in Germany. The catechism of the Church of England in the first book of Edward VI, March 7, 1549, contained merely the baptismal vow, the creed, the ten commandments and the Lord's prayer, with explanations. The part relative to the sacraments was added at the revision of the liturgy, during the reign of James I. The catechism of the Church of Scotland is that agreed upon by the Assembly of Divines at Westminster, with the assistance of commissioners from the Church of Scotland and approved of by the General Assembly in the year 1648. What is called the *Shorter Catechism* is merely an abridgement of the *Larger* and is the one in most common use.

CATECHU, *kat'e choo,* a resinlike substance obtained from the wood of certain species of acacia found in India. It is employed in tanning and dyeing, and is used medicinally as an astringent. In the East the natives chew it. Catechu is extracted from the heartwood, small chips of which are boiled in water until the extract is nearly as thick as tar. The mass is then allowed to harden and is formed into balls. These are wrapped in leaves and thus placed on the market. *Cutch* is a familiar commercial name of this product.

CAT'ERPILLAR. Mrs. Sigourney has written a child's poem about a butterfly, in which the beautiful insect sings as it flies through the sunny air, "I was a worm till I won my wings." Truly the ancients never conceived a myth more beautiful and wonderful than this familiar story of nature—the life history of the butterfly. The gay, winged creature is the fourth and last step in the development of the insect, and the caterpillar is the second, for it is the larva, or worm, that hatches from the egg. A study of the origin of the word *caterpillar* shows that it means, literally, *hairy cat.* Everyone is familiar with the woolly kinds, and the name, so far as they are concerned, is not inappropriate. There are, however, hairless kinds, the skin of which is often beautifully marked lengthwise or crosswise, or covered with rings and eye-spots.

When the tiny caterpillar first emerges from the egg it proceeds to eat, for this is to be its chief duty during the larva stage. The eggs are always deposited where plant food can easily be reached. Before very long the skin of the worm becomes too tight, for it does not increase as the body grows larger. Accordingly the caterpillar soon crawls out through a split which occurs near the front end; that is, it *molts* (see MOLTING). This process is repeated four or five times, and in each case a new skin has formed under the old one.

The body of a full-grown worm is usually divided into twelve rings or segments, and each of the first three rings bears a pair of five-jointed legs. There are also short leg-stumps on the abdomen, which disappear when the last molting takes place. On each side of the head there are six eye-spots; the head also bears a pair of short, three-jointed feelers, besides jaws and other mouth organs. Glands, some with unpleasantly odorous or stinging secretions, frequently occur on the skin.

There comes a time when the caterpillar ceases to eat and begins to prepare for the so-called *pupal,* or resting, stage. The caterpillar stage lasts two or three months in temperate regions, but it may be of two or three years' duration in Arctic lands. The quantity of food eaten is used to nourish the *pupa.* Moth caterpillars spin a casing of silk about them, and form *cocoons,* while the pupal stage of butterflies is passed in a hard skin covering. Butterfly pupae are called *chrysalids.* When the pupa reaches maturity the outside casing splits open, and the butterfly comes out, rather crumpled and weak at first, but soon ready to spread its wings for a happy life in the sunshine. The same processes of development occur in the life history of moths.

CAT'FISH, a large family of fishes inhabiting both fresh and salt water. All species are characterized by their smooth skin and the sharp spines, or thorns, at each side of the head, which, when the fish is frightened or attacked, are erected at right angles to the body. Their name refers to their habit of making a peculiar purring sound when taken out of the water. The fresh-water species in the United States are often known as *horned pout* and *bullhead.* The largest of these species, the Mississippi catfish or bullhead, is abundant in the lower Mississippi and its tributaries. Specimens weighing 150 pounds have been taken, but the average weight is about thirty-five pounds. The flesh has a sweet flavor and is highly nutritious.

CAT'GUT, a cord made usually from the intestines of sheep, sometimes from those of the horse, ass and mule, but never from those

of the cat, as might be supposed from the name. The word is believed to be derived from the Greek for *guitar* and *to pour*. The manufacture is chiefly carried on in Italy and France, by a tedious process. Catgut is used in the manufacture of the strings of harps, violins and other musical instruments and various other articles. The best strings are made in Milan and Naples, Italy.

CATH'ARINE I (?–1727), empress of Russia. She was the daughter of poor parents, who died when she was three years old. In 1701 she married a dragoon of the garrison of Marienburg, and when the town was taken by the Russians in 1702, she was sent with others to Moscow, where she first saw Peter the Great. She acquired a great influence over him, and in 1712 he married her. In 1724 she was crowned at Moscow, and on her husband's death she became sole ruler. She lived only a few months after her accession.

CATHARINE II (1729–1796), empress of Russia, called CATHARINE THE GREAT. In 1745 she was married to Peter, nephew of the Empress Elizabeth. Peter came to the throne on the death of Elizabeth in 1762, but Catharine, with the assistance of her lover, Gregory Orloff, and others, won over the guards, and after Peter had reigned for a few months he was deposed, thrown into prison and afterward killed, while Catharine was proclaimed empress.

On the death of Augustus III of Poland she caused one of her favorites to be placed on the throne, and by this she profited in successive partitions of that country. By the war with the Turks, which occupied a considerable part of her reign, she conquered the Crimea and opened the Black Sea to the Russian navy. Her dream, however, of driving the Turks from Europe and restoring the Byzantine Empire was not to be fulfilled. She improved the administration of justice, ameliorated the condition of the serfs, constructed canals, founded the Russian Academy and in a variety of ways contributed to the enlightenment and prosperity of the country. Her enthusiasm for reform, however, was summarily checked by the events of the French Revolution, and the dissipation and extravagance of her court were a severe blot on her reign.

CATHARINE DE' MEDICI (1519–1589), the wife of Henry II of France, and the daughter of Lorenzo de' Medici. She married the Duke of Orleans, afterward Henry II, and was the mother of four sons, three of whom became kings of France. During the reign of her eldest son, Francis, she began to be prominent in state affairs, and after his death, during her regency for Charles IX, the government was entirely in her hands. Her policy was to keep the two great parties of the Houses of Guise and Condé fighting against each other, taking care that neither should obtain the balance of power. Finally, finding that the House of Condé under the leadership of Admiral Coligny was becoming too strong, she entered into a plot with the Guises which resulted in the massacre of Saint Bartholomew's Day. See BARTHOLOMEW'S DAY, SAINT.

CATHARINE OF ARAGON (1485–1536), queen of England, the youngest daughter of Ferdinand of Aragon and Isabella of Castile, and the first wife of Henry VIII. In 1501 she was married to Arthur, Prince of Wales, son of Henry VII. Her husband died about five months after the marriage, and Henry VII, unwilling to return her dowry, caused her to be married to his remaining son, Henry, procuring a dispensation from the Pope for that purpose. On the accession of Henry to the throne as Henry VIII in 1509, she was crowned with him, and despite the inequality of their ages retained her ascendency with him for nearly twenty years. When Henry became infatuated with Anne Boleyn, Catharine was divorced, and out of this situation came the separation of the Church of England from the Church of Rome. Mary, the only child of Henry and Catharine who survived infancy, became queen of England in 1553. See HENRY VIII.

CATHAY, *kath ay'*, the name applied to China by Marco Polo, the first European to explore that country. He probably derived it from *Khitah*, the name of a northern tribe which had nearly become extinct. The modern Russian name for China is *Khitai*, but Cathay is now used only as a poetical name.

CATHEDRAL, *ka the'dral*, a church of a special character. That which distinguishes a cathedral from other churches is not the feature that is most popularly associated with it—nobility of architecture—but the fact that it is the principal church of a diocese, possessing the chair of a bishop. The name itself is derived from *cathedra*, which means *seat*. Therefore a small, un-

pretentious building could very well be the cathedral church of a diocese, though this is not often the case. In fact, there are so many cathedrals of impressive beauty that the name is very definitely connected with the highest achievements in the art of building. It is one of the tragedies of the World War that the center of the most devastating fighting was in the region between the Atlantic coast and the Alps Mountains, the Seine and the Rhine. In this section were four of the finest Gothic cathedrals ever built, those of Rheims, Amiens, Paris and Cologne. The first was damaged beyond all hope of restoration through the German bombardment that laid in ruins the city; that at Amiens was also considerably damaged.

In respect to architecture, cathedrals naturally vary much, both in style and plan. Those in England are almost all in the Gothic style and cross-shaped in arrangement, having connected with them a chapter house, side chapels, cloisters and crypt. This style and arrangement is also common on the continent of Europe, and in most modern cathedrals, though other styles of architecture have been freely employed. The most noteworthy English cathedrals are Saint Paul's, London, dating from the seventeenth century, and those of Canterbury, Chester, Ely, Exeter, Lichfield, Lincoln, Norwich, Salisbury, Wells and York. The cathedrals of Glasgow and Kirkwall are the only entire cathedrals in Scotland, exclusive of modern edifices. Italy possesses a number of notable cathedral churches; especially beautiful are those of Milan and Florence. Many handsome edifices of this character have also been built in America, particularly Saint Patrick's (Roman Catholic) and the Cathedral of Saint John the Divine (Episcopal) in New York; the Notre Dame Cathedral in Montreal, Canada, and the cathedral in Saint Paul, Minn.

CATHODE, *kath'ode*, **RAYS**, rays thrown off by the cathode, or negative electrode, in an atmosphere of extremely rarified air or other gas. The simplest form of apparatus for producing cathode rays consists of a cylindrical glass tube from which the air has been exhausted and which has platinum wires inserted at each end. When such a tube is connected with the poles of an induction coil or an electrical machine, the discharge passes from one platinum point to another in the form of a brush of blue light or of a red, threadlike pencil of rays extending from one electrode to the other. In a tube from which the air has not been exhausted, the discharge takes the form of a spark. In the most perfect vacuum, all rays disappear and the tube seems filled with a green light, caused by the rays from the cathode. This apparatus is used in the production of the Roentgen rays, or X-rays, and the N-rays. See CROOKES'S TUBES; ROENTGEN RAYS; N-RAYS.

CATHOLIC CHURCH, a phrase equivalent to *universal church*. It was first employed to distinguish the Christian from the Jewish Church, the latter being restricted to a single nation, while the former was intended for the world in general. The name has been retained by the Church of Rome, which was the successor of the primitive church. To the adherents of this faith, the name is peculiarly significant of the characteristics of the Church—unity, visibility, indefectibility, succession, universality and sanctity. The expression is often qualified, especially by those not in the Church, by prefixing the word *Roman*. The Episcopalians claim for themselves the title *Catholic*, but it is, however, popularly used in almost all countries as synonymous with *Roman Catholic*.

Related Articles. Consult the following titles for additional information:
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CATHOLIC UNIVERSITY OF AMERICA, a university at Washington, D. C., under the auspices of the Roman Catholic Church in the United States. It was incorporated and received its constitution from Pope Leo XIII, and was opened for instruction in 1889. The courses of study are intended primarily to give professional training, and to offer to graduates of Roman Catholic seminaries and colleges facilities for original research. The faculty numbers over eighty and the enrollment exceeds 1,650. The library contains 130,000 volumes. Cardinal Gibbons was chancellor from its foundation.

CATILINE, *kat'i line* (108–62 B. C.), a Roman conspirator of patrician rank, whose plots against the republic called forth a series of brilliant orations by Cicero. His name in full was LUCIUS SERGIUS CATILINA. In his youth he attached himself to the party of Sulla, but his physical strength,

passionate nature and unscrupulous daring soon gained him an independent reputation. He was elected praetor in 68 B. C. and governor of Africa in 67. In 66 he returned to Rome to contest the consulship, but was disqualified by an impeachment for maladministration in his province. He was deeply in debt, and, urged on by his necessities as well as his ambition, he entered into a conspiracy with other disaffected nobles. The plot, however, was revealed to Cicero, and measures were at once taken to defeat it. Thwarted by Cicero at every turn and driven from the senate, Catiline fled and put himself at the head of a large but ill-armed following. The news of the suppression of the conspiracy and the execution of the ringleaders at Rome diminished his forces, and he led the rest toward Gaul. A Roman force surrounded the rebels and, driven to bay, Catiline turned upon the enclosing army and died fighting.

CAT'KIN, the common name of a class of flowers borne by the birches, alders, willows and other trees. A catkin consists of a cluster of one-sex flowers without petals, protection being afforded by modified leaves, or bracts. The name refers to the general appearance of the flower cluster, which resembles the tail of a cat, but the botanical term for these flowers is *ament*. The catkins of the pussy willow, poplar and chestnut are among the most attractive of the group.

CAT'NIP, or **CAT'MINT**, a plant of the mint family, widely diffused throughout North America and Europe. It grows erect to a height of two or three feet, has whorls of rose-tinged, whitish flowers, and stalked, downy, heart-shaped leaves. It has much the same fascination for cats as valerian root. In some sections a tea brewed from the leaves is used as a home remedy for colic and as a tonic.

CA'TO, MARCUS PORCIUS (95–46 B. C.), a Roman soldier and statesman, called Cato of Utica, from the place of his death, to distinguish him from the censor, his great-grandfather. He earned a reputation as a volunteer in the war against Spartacus, served as military tribune in Macedonia and was made quaestor in 65 B. C. His rigorous reforms won him general respect, and in 63 B. C. he was chosen tribune of the people. During the troubles with Catiline, Cato gave Cicero important aid, and at the same time he prepared to thwart the ambitious projects of Pompey, Caesar and Crassus. To get rid of him, they sent him to take possession of Cyprus, but after successfully accomplishing his mission, he returned, opposed the law for conferring extraordinary powers on the triumvirs, and in 54 B. C. enforced a law against bribery. On the breach between Pompey and Caesar, he joined Pompey. After receiving news of Pompey's defeat at Pharsalia, he sailed to Cyrene and effected a junction with Metellus Scipio at Utica. He took command of that city, but, its defense appearing hopeless after the defeat of Scipio, he stabbed himself with his sword.

CATO, MARCUS PORCIUS, surnamed PRISCUS, THE ELDER, and SAPIENS, THE WISE (234–149 B. C.), was a celebrated Roman statesman, and the first important writer of Latin prose. He inherited from his father, a plebeian, a small estate in the territory of the Sabines and spent the early years of his manhood in its cultivation. At the age of seventeen, he served his first campaign under Fabius Maximus in the Second Punic War was present at the siege of Capua and in 207 B. C. fought at the siege at Tarentum. After the war was ended he returned to his farm, but later, by the advice of Valerius Flaccus, removed to Rome, where his oratorical abilities had free scope. He rose rapidly in rank, accompanied Scipio to Sicily as quaestor, became an aedile and in 198 was chosen praetor and appointed to the province of Sardinia. Three years later he gained the consulship, and in 194 for his brilliant campaign in Spain obtained the honor of a triumph. In 191 he served as military tribune against Antiochus and then returned to Rome.

For several years Cato exercised a practical censorship, scrutinizing the characters of candidates for office and denouncing false claims and peculations. His election to the censorship in 184 set an official seal to his efforts, the unsparing severity of which made his name proverbial, and gave our language the word *censorious*. In 157 he was sent to Carthage on diplomatic business, and so impressed was he by the strength of the city that he warned his countrymen repeatedly of the danger of so powerful a rival. From that time on every speech he made in the senate ended with the now historic phrase, "Carthage must be destroyed."

CAT'S-EYE, a variety of quartz, very hard and semitransparent, and from certain

points exhibiting a yellow internal radiation resembling a cat's eye. It is found in Ceylon and Malabar, and when cut and polished forms a gem of considerable value.

CATSKILL MOUNTAINS, a beautiful range of mountains in New York state. They lie on the west side of, and nearly parallel to, the Hudson, from which their base is, at the nearest point, eight miles distant. Their length is fifty miles and their width thirty miles. The two highest peaks are Slide Mountain, 4,250 feet, and Hunter Mountain, 4,025 feet. The Dunderberg, another peak, is the scene of Washington Irving's *Rip Van Winkle*. The Catskills are visited by tourists, and on their slopes are numerous resorts. The Catskill Aqueduct, which partly supplies New York City with water, begins in these mountains.

CAT'SUP. See KETCHUP.

CATT, CARRIE CHAPMAN, a prominent American suffragist, born in Ripon, Wis. After her graduation from the State Industrial College of Iowa she took a course in law, then entered the teacher's profession, becoming a public school superintendent at Mason City, Iowa. In 1890 she married George William Catt (died 1905), and about this time began active work for the woman suffrage cause. She served as president of the national association in America and also of the International Woman Suffrage Alliance, and has lectured in behalf of political equality throughout Europe and America. Mrs. Catt was a leader in the campaign for the adoption of the Susan B. Anthony suffrage amendment which passed the national House of Representatives in January, 1918. In March, 1919, she was elected temporary chairman of the newly-organized League of Woman Voters, which held its first convention in Saint Louis.

CAT-TAIL, a family of marsh plants whose most prominent feature is the cylindrical spike of dark-brown flowers at the top of the stem. The leaves are long, slender and waving, and altogether these plants have a very attractive appearance. There are two American species, the larger of which is often called *bulrush*. It grows to a height of five feet or more. The smooth, handsome flower heads of the cat-tail are used for decorations, and as the pollen is inflammable, children sometimes soak the plant in kerosene and use it as a torch. In some countries the young shoots are eaten as a vegetable, and in the United States the leaves are occasionally used by coopers, who place them between the staves and in the seams of barrel heads.

CAT'TEGAT, or **KAT'TEGAT**, a large gulf of the North Sea, between Denmark and Sweden. It is about 150 miles long and ninety miles wide, and forms a connecting link between the North and the Baltic seas. On account of its many shoals and its frequent storms, it is dangerous for navigation. The Cattegat is noted for its herring fisheries. The name is the Scandinavian word for *cat's throat*.

CATTLE, *kat'l*, a group of cud-chewing mammals which are among the most valuable of all domesticated animals. The term has had a wide application, but is usually restricted to animals of the ox family—oxen, cows and steers. Cattle are utilized as beasts of burden, but they are principally valuable in providing mankind with food and leather, the latter made from their hides. Their food products are milk and meat, and the great importance of these products has led to the breeding of two types of cattle, the *beef* and the *dairy* groups.

Beef Cattle. Cattle of this type are closely built, with small bones evenly covered with flesh. The chief breeds are as follows:

(1) *Shorthorns* (also called *Durhams*), originating in the English counties of Durham and York. They are red; white and red; pure white, or roan. Their horns, which are short and blunt, and about twelve inches long, stick out straight from the sides of the head. Shorthorns outnumber all other beef breeds.

(2) *Herefords*, originating in County Hereford, in the southwestern part of England. These cattle are red, with white face and breast, white legs below the knees, and white on the top of the neck and along the base of the adbomen. They have horns like those of the Shorthorns.

(3) *Aberdeen-Angus*, a breed of black cattle originating in Scotland. They are hornless, and have short legs, short, wide head and short neck.

(4) *Galloways,* a breed of medium-size, hornless cattle originating in Southwestern Scotland. They resemble the Aberdeen-Angus, but are especially characterized by their long hair.

Dairy Cattle. Cattle bred chiefly for milk are much more loosely built than beef cattle. The joints are prominent, and there is no superfluous flesh. The hips and pelvic region are higher than the shoulders, and the abdomen and udders enlarged. The principal breeds are as follows:

(1) *Holstein-Friesian,* a breed originating in Holland. These cattle are black and white, and have small horns curved inward and upward. They are the largest of the dairy breeds, and give the most milk, though it is not the best in quality. The Holstein-Friesian breed has been developed most extensively in the United States.

(2) *Guernsey* and *Jersey,* bred on the Channel islands of the same names. There milk is noted for its high percentage of butter fat. Jersey cows are of a fawn color, varying from light to dark and with or without white patches. Guernseys are larger and more loosely built than Jerseys, and are yellowish, reddish fawn or brownish. White markings often occur. Both breeds have short, curving horns.

(3) *Ayrshire,* originating in County Ayr, Scotland, about the size of the Jersey breed but more compactly built. The typical color is red and white, the horns are long and upward curving. Ayrshires produce milk of excellent quality.

Related Articles. Consult the following titles for additional information:
Beef
Domestic Science
Food
Meat
Milk
Meat Packing

CAUCASIAN, *kaw ka'shan,* **RACE.** See RACES OF MEN.

CAUCASUS, *kaw'ka sus,* a range of mountains extending from the Black to the Caspian Sea and forming one of the natural barriers between Europe and Asia. The length of the main range is 940 miles, and the width of the system varies from 30 to 130 miles. The greatest height is attained in the center, where there are said to be more than twenty peaks exceeding Mont Blanc in altitude. Of these Elburz, 18,470 feet, is the highest. The lower slopes are covered with dense forests, mostly of evergreen, and the scenery is grand and gloomy.

These mountains are the dividing line between those Russian territories known as Cis-Caucasia and Trans-Caucasia, which are on the north and south sides of the range, respectively. The Caucasian territory was overrun by the Turks during the World War.

CAUCUS, *kaw'kus,* a term applied to a meeting of members of a political party to agree upon candidates for office, or a meeting of members of one political party in a legislative body to propose party measures. Its origin is referred to an affray between some British soldiers and some Boston rope makers in 1770, which resulted in meetings of rope makers and *caulkers,* called by the Tories *caucus* meetings. The species of caucus first named above has gradually changed from an informal gathering to one at which secret votes are cast, as at general elections, under the influence of laws to prevent corruption. The second kind of caucus is still much used in legislative bodies, to determine the policy of the party representatives, and to choose candidates for office in the body. Until 1824 candidates for President and Vice-President were chosen by caucuses of members of Congress.

CAULIFLOWER, *kaw'li flou er,* a garden variety of cabbage, in which cultivation has caused the flowers to assume, when young, the form of a compact, fleshy head, which is highly esteemed as a table vegetable. It has a more delicate flavor than cabbage and about the same food value.

CAULIFLOWER

CAUSTIC, *kaws'tik,* a name given to substances which have the property of burning, corroding or disintegrating animal or vegetable matter. *Lunar caustic* is a name given to nitrate of silver when cast into sticks for the use of surgeons. *Caustic potash* is the hydrate of potassium; *caustic soda,* the hydrate of sodium.

CAVALIERI, *kah vah ly a're,* LINA (1874–), an operatic soprano of Italian birth, the wife of the tenor, Lucien Muratore. She was born in Rome, and is accounted one of the most beautiful women on the modern stage. Cavalieri began her artistic career by singing in cafés and concert halls, but was not content to remain in obscurity, and by persevering effort she attained an honored place in

opera. After her initial appearance in grand opera at the Royal Theater in Lisbon (1900), she sang a number of important rôles, including those in *La Bohéme, La Traviata, Rigoletto, Mignon* and *Fedora.* In America she has also sung in concert and acted in moving pictures.

CAVALIERS, *kav a leerz',* a name applied in history to the partisans of Charles I of England, as opposed to *Roundheads,* the name given to the adherents of the Parliamentary cause.

CAVALLERIA RUSTICANA, *kah vahl la reé a roo ste kah'nah,* the most successful of the operas composed by Pietro Mascagni, an Italian musician. It is in one act, but there is a short period during which the stage is vacant. At this time the orchestra plays the *Intermezzo,* one of the best loved musical compositions of to-day.

The libretto of the opera, written by two friends of the composer, is based on a story of life in Sicily. Santuzza, the heroine, is a beautiful girl who wins the love of Turiddu after he has been deserted by Lola. The latter had married Alfio, the village carter, while Turiddu was away fighting. Santuzza discovers to her sorrow that Turiddu is again coming under the fascination of his former sweetheart, and despairingly tells Alfio of the situation. Turiddu is then challenged to a duel with knives and killed. The opera has been unceasingly popular since its first presentation at Rome, in 1890. It is full of spirited and dramatic action, and the music is very melodious.

CAV'ALRY, a body of troops which serve on horseback; one of the three great classes of troops, and a formidable power when properly employed (See INFANTRY; ARTILLERY). Cavalry is well adapted to speedy movements, which enable a commander to avail himself of a decisive moment and strike quickly whatever weak point an enemy exposes. It is serviceable, too, in protecting the wings and center of an army; for intercepting the supplies of the enemy; for procuring intelligence; for covering a retreat, and for foraging, as well as for many another purpose.

Cavalry was an important arm of the service with the Greeks and Romans. In medieval times mounted knights practically displaced infantry and caused the true value of concerted cavalry action to be forgotten; but under Charles XII of Sweden and Frederick the Great of Prussia, the value of cavalry was again recognized, and it was established in the important position it has since held.

In the first four years of the World War, beginning in 1914, cavalry was practically useless, for the contest almost at once developed into entrenched warfare. In 1918, however, when fighting conditions were more open, cavalry was used to a limited extent in pursuing the fleeing enemy.

Cavalrymen were once armed only with swords and lances, but within recent years the pistol has been added to their equipment, and the lance has been less used.

CAVE, or **CAV'ERN,** an opening of some size in the solid crust of the earth beneath the surface. Caves are principally met with in limestone rocks, but sometimes in sandstone and in volcanic rocks. Some have been formed by the upheaval of the earth's crust, which caused some strata to slide over others in such a way as to leave caverns beneath. The size of these caverns may have been increased by the action of water. The caves in volcanic regions were undoubtedly formed while the lava was in a plastic state; and they are supposed to be due to the expansion of gas, which formed caverns in the rock in a manner similar to that in which pores are formed in bread while baking. But water is the most important agency in the formation of caves, and most of the large caverns have been formed by its action. Caverns of this nature are generally found in limestone regions.

Some caves are of great extent, such as Mammoth Cave, in Kentucky, which has more than 150 miles of passageways. Others are remarkable for their depth. The most noted of these is the Frederikshall, in Norway. The Wyandotte Cave, in Crawford County, Ind., and the Luray Caverns, in Page County, Va., are celebrated for their beautiful stalactites and stalagmites (see STALACTITE). Fingal's Cave, on the Island of Staffa, is remarkable for the basaltic columns forming its walls and roof.

Many caves contain the remains of animals, some of which are extinct, and some of which show that the animals living in the region at the time were similar to those now found in different parts of the world. Examples are the remains of the reindeer and hyena, which are found in some caves in Southern Europe. The reindeer now lives

only in the high latitudes, and the hyena is found in South Africa. In some of these caves human bones are found intermingled with those of the animals, as are pieces of charcoal and rude implements, showing that men lived upon the earth at the same time as the animals whose skeletons are found.

Related Articles. Consult the following titles for additional information:

Fingal's Cave	Mammoth Cave
Luray Caverns	Wyandotte Cave

CAVEAT, *ka've at,* a formal notice given to the Patent Office by an inventor asserting his claim to priority of consideration in connection with the issuing of a patent. It may be that the invention is not quite ready to be presented for patent rights; a caveat will forestall the efforts of another person to secure a patent on the same device. It is effective for a year, and may then be renewed.

CAVE DWELLERS, the name applied to the inhabitants of caves in the early stages of human civilization. Scientists classify the caves of these prehistoric races according to the periods of geologic time in which they lived. In some have been found bone and rough stone tools and implements, such as lanceheads, saws, harpoons, awls, etc. Remains of animals have also been found, and various relics indicating the rude mode of life of these cave men. The Eskimo are the nearest approach of any modern race to the cave dwellers. The caverns of Southwestern North America were inhabited by a race called cliff dwellers (which see). The latter represent a higher stage of civilization.

CAVIAR, *kav'e ahr,* or *ka vyahr',* or **CAVIARE,** a food prepared from the roe of the sturgeon. Caviar is made by freeing the eggs from the tissue which holds them together, then washing them and rubbing them with salt, after which they are dried and packed in kegs. It is considered a great delicacy, especially among the Russians, in whose country it is manufactured in large quantities. The abundance of sturgeon in the Great Lakes has given rise to the manufacture of caviar in some parts of the United States, and Canada.

It is not a general article of diet because of its high cost; the piquant flavor is agreeable only to a cultivated taste. A reference to this delicacy occurs in Shakespeare's Hamlet, in which a certain play is said to be "caviar to the general."

CAVITE, *ka ve'tah,* a town of the Philippine Islands, capital of the province of Cavite, situated on Luzon Island, eight miles southwest of Manila. It is the principal naval headquarters of the United States in the Philippines and has arsenals, repair shops and dry docks. The theater and cathedral are the most important public buildings. The manufacture of tobacco and hemp is carried on. The town was an important naval station under Spanish rule and it was near Cavite that Admiral Dewey first attacked the Spanish fleet, May 1, 1898. Population, about 4,500.

CAVOUR, *ka voor',* Count Camillo Benso di (1810–1861), a distinguished Italian statesman, one of the makers of United Italy. He was educated in the military academy at Turin, and after completing his studies he made a journey to England, where he remained for several years, making himself acquainted with the principles and working of the British constitution and forming friendships with some of the most distinguished men. From his earliest entry into political affairs his chief aim was to unite Italy under a central government, which should be independent of Austria. He became a member of the Sardinian Parliament in 1848, and two years later, minister of commerce and agriculture.

In 1852 he became premier, and not long afterward he took an active part in cementing an alliance with Great Britain and France, and making common cause with these powers against Russia during the Crimean War. When the war closed, Cavour was appointed a delegate to the Peace Congress, where he succeeded in winning for his state the recognition of the European powers. He next made preparations for war with Austria, obtained the aid of France, and in 1858, by his hostile attitude, forced Austria to open the struggle. The result was victory for Sardinia, and Cavour was able, with the aid of Garibaldi, to unite all Italy, except Rome and Venice, by the beginning of 1861. He lived to see the meeting of the first Italian Parliament.

CAWNPORE, *kawn'pohr,* India, an important military and commercial city on the right bank of the Ganges, 628 miles northwest of Calcutta. During the Sepoy Rebellion in 1857 it was the scene of a mutiny of the native troops, which resulted in the massacre of many men, women and children. The place was relieved by the British under General Havelock, but not in time to pre-

vent the slaughter of the prisoners. A white marble memorial marks the place where 200 bodies were thrown into a well. As the junction point of four important railway systems, Cawnpore has become a trade center of great importance, and it possesses prosperous manufactories of cotton, harness and other goods. Population, 1911, 178,557.

CAX'TON, WILLIAM (1422–1491), the man who introduced the art of printing into Great Britain. He served an apprenticeship to Robert Large, a London mercer, and on the latter's death went into business for himself at Bruges. He had translated the popular medieval romance, *Collection of the Histories of Troy,* and in order to multiply copies he learned the newly discovered art of printing. This work was printed either at Cologne or Bruges about 1474, and is the earliest specimen of typography in the English language. In 1477 he published the first book printed in England. Caxton translated twenty-one books, mainly romances, from the French, and one from the Dutch, helping materially to fix the literary language of the sixteenth century. Among his works were the *Game of Chess* and *Dictes and Notable Sayings of the Philosophers.* He was buried in the Church of Saint Margaret's, Westminster.

CAYENNE, *ka en'*, or *ki en'*, FRENCH GUIANA, the capital of the colony and a seaport on an island of the same name, at the mouth of the Cayenne River. The harbor is large, but shallow, and the port sends out all products exported from the colony. The city has been in French possession since 1675. Population, 1911, 13,527.

CAYUGA, *ka yoo'gah,* an Indian tribe formerly dwelling on the shores of Cayuga, Lake, New York. These Indians belonged to the original Iroquois confederacy, and were called the *Youngest Brother,* because they were the last to join it. They were the smallest tribe of the union. At the outbreak of the Revolution they joined cause with the British and removed to Canada. Of the remnant still surviving, the majority live on the Six Nations Reserve in Ontario. A few are scattered among the Oneidas and Senecas in the United States. See FIVE NATIONS, THE.

CAYUGA, *ka yu'gah,* **LAKE**, a beautiful lake, situated west of the center of the state of New York. It is thirty-eight miles long and from one to three and one-half miles wide, and it discharges its waters into Lake Ontario, through the Seneca and Oswego rivers. The principal towns on its banks are Cayuga, Ithaca, seat of Cornell University, and Aurora. This lake is one of the group known as the Finger Lakes.

CEBU, *se boo',* or **ZEBU**, one of the Philippine Islands, lying between Luzon and Mindanao. It is 130 miles long and twenty miles wide, and has an area of 1,782 square miles. Sugar, hemp, cotton and rice cultivation, fishing and the manufacture of native wine, refined sugar, cloth and pottery are the chief industries. The town of Cebu, the capital, on the eastern coast of the island, the oldest Spanish settlement in the Philippines, is a place of considerable trade and has a cathedral and several churches. The island was first occupied by the United States in February, 1899, and was given civil government as a province in 1901. Population of the island, about 600,000.

CECIL, *ses'il* WILLIAM, Lord Burleigh (1520–1598), an English statesman. He was secretary of state under Edward VI, and although as a Protestant he resigned his position on the accession of Mary, he entirely escaped persecution, though he never denied his Protestant tendencies. When Elizabeth came to the throne she chose Burleigh as her secretary of state, and this office he held until his death. The glory of the reign is due to him, as the real director of the policy, more than to any other man.

CECILIA, *se sil'yah,* SAINT, the patron saint of music, falsely regarded as the inventor of the organ. She is said to have suffered martyrdom A. D. 230, although other dates are given. In the Roman Catholic Church, her festival (November 22) is celebrated with beautiful music. Her story forms one of Chaucer's *Canterbury Tales,* and Dryden, in his *Alexander's Feast,* and Pope, in his *Ode on Saint Cecilia's Day,* have sung her praises. Raphael, Domenichino, Dolce and Mignard have represented her in celebrated paintings.

CECRO'PIA, a genus of beautiful South American trees, of the breadfruit order. One of these, the *trumpet-wood,* is remarkable for its hollow stem and branches, which the Indians make into drums and wind instruments. The light, porous wood is also used by them for making fire, which they accomplish by rubbing it against a harder

wood. The inner bark is fibrous and strong and is used for cordage.

CECROPS, *se'krops*, in Greek legend, the first king of Attica. The famous citadel of Athens, called Cecropia in his honor, was said to have been built by him, and tradition also credited him with the founding of Athens. Asked to decide who should have the honor of naming the city, Athena or Poseidon, he gave the honor to the goddess, whose name was thus perpetuated in Athens.

CEDAR, *se'dahr*, the name of several species of evergreen trees belonging to the pine family. Cedars are distinguished by their horizontal, wide-spreading branches, their fine, compact leaves and their reddish wood, which is fragrant and very durable. The famous cedars of Lebanon, so frequently mentioned in the Bible, belong to the most widely known species. Of these trees comparatively few now remain, and they do not grow in any other part of Palestine. The most celebrated group is situated not far from the village of Tripoli, at an elevation of about 6,000 feet above the sea. The circumference of the largest trees varies from about eighteen to forty-seven feet. The term is also applied to the deodar, a somewhat similar tree, which is a native of India and often attains a height of 150 feet.

The white cedar is common from Maine to Mississippi. It is distinguished by its flat, scalelike leaves and branches, extending horizontally or slanting downward, and its fragrant odor, due to its balsam. The tree often attains a height of eighty to ninety feet, but seldom exceeds two feet in diameter. The timber is valuable for cooperage, fence posts and the manufacture of chests for storing furs and other articles which it is desired to protect from insects, since this wood is poisonous to them. The twigs are used in the manufacture of cedar oil.

The *red cedar* is found in the swamps of Florida and in other localities in that vicinity. The wood is reddish or yellowish-red and is very durable, especially for uses where it comes in contact with water. Because of the value of its timber this tree has been nearly exterminated in some places. A variety of red cedar, known as the *Bermuda cedar* and found in the West Indies, is extensively used for making the cases of lead pencils.

CEDAR CREEK, Battle of, the last battle of Sheridan's campaign in the Shenandoah Valley, in 1864, fought on October 19. During the early part of the battle Sheridan was absent, having been called to Washington, and the Federals were commanded by General Wright. They were attacked at daybreak by the Confederates, who completely routed a large part of the Union force. With some difficulty Wright reformed his line, though suffering heavy loss. At this time General Sheridan, who had learned of the battle while at Winchester, twenty miles away, met the disheartened Federals, inspired them with new enthusiasm and led an attack which put the Confederates to flight with great loss. Sheridan's exploit inspired Read's famous poem, *Sheridan's Ride*.

CEDAR MOUNTAIN, Battle of, a battle of the Civil War, fought near Culpeper Court House, Va., August 9, 1862, between a Union force of 8,000 under General Banks and a Confederate force of 24,000 under "Stonewall" Jackson. Banks had come upon the rear guard of Jackson's army and attacked it vigorously. Jackson rallied his men and drove back the Union force. The Confederates lost 1,300, the Federals, 1,800.

CEDAR RAPIDS, Iowa, founded in 1845 and incorporated in 1856, is in Linn County, about eighty miles southwest of Dubuque, on Cedar River, not navigable, and on the Chicago & North Western, the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & Saint Paul and the Illinois Central railroads. There are four railroad bridges over the river. The city has a number of wholesale houses, Carnegie and Masonic libraries, a Federal building and an auditorium. The industries include a wide range of activity; principal among them are railroad shops, pork packing establishments, cereal mills and a starch factory. Rapids in the river furnish water power. Coe College (Presbyterian) is located here. The commission form of government has been adopted. Population, 1910, 32,811; in 1917, 38,033 (Federal estimate).

CELEBES, *sel'e beez*, one of the larger islands of the Dutch East Indies, between Borneo on the west and the Moluccas on the east. The area is about 72,000 square miles. Gold is found in all the valleys of the north peninsula, which abounds, also, in sulphur and copper. Tin occurs at various points. Diamonds and other precious stones are found. The chief cultivated products are tropical fruits, spices, corn, rice, tobacco,

indigo and sugar. The trade in trepang (which see) is very important.

The inhabitants may be classed into two groups, the Mohammedan semicivilized tribes and the pagans, who are more or less savage. The capital is Macassar, in the southwestern part of the island, and through this port most of the trade of the island passes. In 1660 Macassar was taken by the Dutch, the southern portion of the island was put under Dutch rule and the Portuguese were expelled. The island was conquered by the British in 1811, but a few years later it was again given up to the Dutch, in whose possession it has remained ever since. Population, estimated, 2,000,000.

CELERY, *sel'er i,* a plant of the parsley family, native to the temperate parts of Europe, but extensively cultivated in North America, where it is highly popular as a salad vegetable. In its natural state it is bitter and tough, but the crisp, tender stalks of the cultivated varieties have a delightful flavor. Celery is grown from seed, which is placed in a hotbed for an early crop, and in the open for a late crop. If the plants are desired for summer or fall use, boards are placed about the stalks to shut out the light. By this means the coloring matter in the tissues is destroyed and the stalks are whitened, or *blanched* (see ETOLIATION). Celery grown for winter use is blanched by having earth heaped up about the stalks. On the approach of winter the plants are taken up and set in pits or in a cool cellar. Moist earth is packed around the roots and the blanching process continues. Another method consists in making rows from six to twelve inches apart, whereby the plants are self-blanched, only the outside rows needing artificial darkening.

Celery needs moisture and a fertile soil. It is grown extensively in Michigan, California, New York and Florida. The center of the industry in Michigan is in the vicinity of Kalamazoo.

CELESTINE, *sel'es tin,* the name of five Popes, of whom two were of special note.

Celestine III occupied the Papal chair from 1191 to 1198. He was eighty-five when elected, and his short reign was troubled. He excommunicated Henry VI of Germany for seizing Richard the Lion-Heart while the latter was on his way home from the Crusades, and he endeavored unsuccessfully to bring John of England to terms for his rebellious behavior. In 1192 Celestine confirmed the statutes of the Teutonic Order of Knights.

Celestine V. Pope from August to December, 1294. He had been a Benedictine monk and was noted for the severity of the discipline he exacted of himself. During his brief tenancy of the high office he issued two decrees, one of which confirmed the decree of Gregory X that the cardinals when in conclave should be kept in confinement. The other decree affirmed the right of the Pope to abdicate. He himself acted upon this right after ruling a little over five months. His successor, Boniface VIII, had him imprisoned because he feared he might become the leader of a new party. Celestine died in May, 1296. He was canonized in 1313.

CELIBACY, *sel'i ba si,* the state of being unmarried; especially applied to the voluntary life without marriage followed by many religious devotees and by some orders of clergy, as those of the Roman Catholic Church. The ancient Egyptian priests, the priestesses of ancient Greece and Rome and the Buddhist priests of the East made celibacy a rule of life. Among the Christians the earliest aspirants to the spiritual perfection supposed to be attainable through celibacy were not ecclesiastics, as such, but hermits and anchorites.

CELL, *sel,* in biology, the unit of structure of plants and animals. It is a microscopic, semifluid portion of matter, surrounded by a cell wall, and consists of a soft mass of living, jellylike matter called *protoplasm,* and a central structure, or organ. The latter, called the nucleus, is a small roundish body generally more solid than the rest, sometimes having within it a still smaller body called the *nucleolus.* The simplest plants and animals have but one cell, while the more complex have masses of many cells. Cells are nearly spherical in outline, but if pressure is exerted upon them by the other cells, they may take on various modified forms, becoming regularly polygonal, spindle-shaped, cylindrical or star-shaped. The cell substance, or protoplasm, which surrounds the nucleus, is an albuminous substance possessing fundamental vital properties. It is organized into various structures called the *organs* of the cell, each organ having one or more special functions. The nucleus governs the process of reproduction.

The cell multiplies by the division of the whole cell into two cells. This process begins at the nucleus. When the cell reaches a certain size, its nucleus divides along a definite line, and the two parts grow to the size of the first and repeat the process. See PROTOPLASM.

CELLINI, *chel le'ne*, BENVENUTO (1500–1571), an Italian sculptor, engraver and goldsmith. As the result of a duel he was forced to leave Florence, and afterwards, having gone to Rome, he gained the patronage of Pope Clement VII. Cellini's quick temper and quarrelsome disposition led him into frequent brawls, and he stayed in few places for any length of time. At the court of Francis I of France he modeled the *Nymph of Fontainbleau*, an excellent example of his work. He afterward returned to Florence, and under the patronage of Cosimo de' Medici he made a *Perseus with the Head of Medusa* in bronze, which is still an ornament of one of the public squares, and a statue of Christ, in the chapel of the Pitti Palace, besides many excellent dies for coins and medals. Most of his works lack simplicity and abound in details. When Cellini was fifty-eight years old, he began to write an autobiography, in which the traits of his character appeared clearly in his vivid pictures of that period of the Renaissance.

CELLULOID, *sel'u loid*, an artificial substance extensively used as a substitute for ivory, bone, hard rubber and coral, having a close resemblance to these substances in hardness, elasticity and texture. It is composed of cellulose, or vegetable fibrine, reduced by acids to a substance resembling soluble cotton (see GUNCOTTON); camphor is then added, and the compound is molded by heat and pressure to the desired shape. Celluloid is used chiefly for buttons, handles for knives, forks and umbrellas, billiard balls, backs of brushes, piano keys, napkin rings, opera-glass frames, pipestems, films for cameras and other small articles. It can be variously colored.

CELLULOSE, *sel'u lohs*, a compound of carbon, hydrogen and oxygen, which forms the chief part of the cell wall of all vegetable cells. It is not present in animal tissues, but a certain amount is absorbed by man in digestion, and it is supposed that it has the effect of stimulating the movements of the intestines. Cellulose is the principal constituent of cotton fibers, and is found in abundance in flax fibers, wood and straw. It is especially abundant in the stalks and leaves of plants; celery and lettuce, for instance, contain large amounts of it. Cellulose is manufactured in large quantities and is used in making vegetable parchment. Combined with nitric acid, it forms powerful explosives, among which is guncotton. As cellulose swells when wet, it is used for the packing of joints and to prevent leakage in water pipes.

CELTS, *selts*, the earliest Aryan settlers in Europe, according to the common theory. They appear to have been driven westward by succeeding waves of Teutons, Slavonians and others. Herodotus mentions them as mixing with the Iberians, who dwelt round the River Ebro, in Spain. At the beginning of the historic period they were the predominant race in Britain, Ireland, France, Belgium, Switzerland, North Italy, Spain and elsewhere. The Romans called them Gauls. They appear to have reached the zenith of their power in the second and third centuries B. C. Some tribes of them, overrunning Greece, settled in a part of Asia Minor, to which the name of Galatia was given. Finally, they fell before the resistless power of Rome and either became absorbed with the conquering races or were confined to the extreme northwest of Europe. At an early date the Celts divided into two great branches, speaking dialects widely differing from each other, but doubtless belonging to the same stock. One of these branches is the Gaelic, represented by the Highlanders of Scotland, the Celtic Irish and the Manx; the other is the Cymric, represented by the Welsh, the inhabitants of Cornwall and those of Brittany. The sun was the principal object of worship among the Celts.

CEMENTS, *se ments'*, or *sem'ents*, compounds used to stick together other substances. There are many varieties of cement, such as glue, mucilage, paste, mortar and building cements. Building cements are made of certain kinds of limestone containing clay and sand. A small quantity of oxide of lead is added to the mixture. Cements are divided into two classes, *hydraulic* or *water* cements, which will harden under water, and those which will not harden under water.

Portland cement is the most important variety used for building purposes. It is made by two processes, the wet and the dry. In the wet process the clay and limestone are mixed with a large quantity of water in a mechanical mixer. When the mass has been thoroughly mixed, it is emptied into large reservoirs and allowed to settle. In time the heavy material or raw cement settles

to the bottom. The water is drawn off and the raw cement is left to dry in the air until it is a thick paste. It is then placed in the dry-room, where all the moisture is evaporated, when it is burned in a suitable kiln. The kiln is brought to a white heat, and the cement is kept in it until it is almost glass, or until it is nearly vitrified. It is taken from the kiln in the form of clinkers, which are greenish in color. These clinkers are ground to a fine powder between crushing rolls and packed in bags or barrels ready for shipment.

In the dry process the clay and limestone are first separately dried in a dry-kiln, until all the moisture is expelled. The clay and limestone are then mixed and crushed, and the powdered mixture is tempered with water to a stiff paste in a brick-making machine and molded into bricks. The bricks are then burned to the cement clinker in kilns and are finally ground into powder. A natural cement is made from limestone which has the proper ingredients, but it is not as good as the manufactured cement, because the proportions of silica, alumina and iron do not run evenly in the limestone.

Portland cement concrete roads have been laid in very numerous sections of America since the advent of the automobile. In 1909 there were 364,000 square yards of this form of paving in the country; in 1916 the amount which had been laid was estimated at 19,340,000 square yards. The advantages of this paving are hardness, durability and uniformity of surface. See ROADS AND STREETS.

CEMETERY, *sem'e ter y* a place of burial. The colonial custom in the United States was to use the churchyards for burial places, and in some of the older cities, such as Boston, these yards are still seen around the churches, though burial in them has long since ceased. With the increase of population it became evident for sanitary reasons that burial places should be outside of the towns, and the modern cemetery was established. The oldest cemetery in the United States is Mount Auburn, near Boston, famous for its beautiful walks and drives and as the burial place of many eminent Americans. Laurel Hill in Philadelphia, Greenwood on Long Island, Lakeview at Cleveland, Ohio, containing the Garfield Memorial, and Graceland and Rose Hill in Chicago, are among the great cemeteries of the country, noted for their beauty.

There are eighty-three national cemeteries in the United States. These contain the remains of soldiers who were killed or died from disease while in the service of their country. These cemeteries are under the supervision of the quartermaster-general's office of the War Department and are maintained by appropriations made by Congress. The national cemeteries are marked by their simplicity and their beauty. The largest is that at Arlington Heights, near Washington, which contains over 20,000 graves. See ARLINGTON NATIONAL CEMETERY.

Some of the most noted cemeteries in the Old World are the Père Lachaise in Paris, which was the first of modern cemeteries established in Western Europe; Kensal Green, Highgate and Abner Park, London, and the West London Cemetery at Brompton. Burial places cannot be located within towns in England. In Southern Europe catacombs were formerly used and are still employed to a limited extent. See CATACOMBS; BURIAL.

CENCI, *chen'che,* BEATRICE (1577–1599), an Italian girl, the daughter of Francesco Cenci, a wealthy Roman nobleman. According to an old story, her father treated his family with such brutality that Beatrice, together with her stepmother and brothers, brought about his murder one night at his palace near Naples. Beatrice was imprisoned, with her accomplices, and after a trial was put to death. Shelley's drama, *The Cenci,* is founded upon this story. It is now thought that the beautiful portrait in the Barberini Palace, Rome, known as Guido Reni's *Beatrice Cenci,* is not of Beatrice, nor by Guido Reni.

CENIS, *se nee',* MONT, a mountain belonging to the Graian Alps, between Savoy and Piedmont, having an altitude of 11,755 feet. It is famous for the winding road, forty miles in length, constructed by Napoleon I from France to Italy, and for an immense railway tunnel.

Mont Cenis Tunnel. This is a railway tunnel through the Mont Cenis Pass, connecting the Italian province of Turin with Savoy, France. It is eight miles long and has two lines of railway. The cross section is twenty-six feet four inches wide in the broadest part and twenty-four feet seven and one-half inches high. The expense of construction was about $15,000,000. Work was begun in 1857 and the tunnel was completed in 1872. The railway enters the tunnel by means of special

curved sections at each end. The power drill and the air compressor were first used in connection with this work.

CENOZOIC, *se no zo'ik,* **ERA,** the latest general division of geologic time, extending from the Mesozoic Era to the present. The primitive ancestor of man appeared in this era, and all modern forms of plant and animal life developed toward their present character. See GEOLOGY; MESOZOIC ERA.

CENSER, *sen'sur,* a vase or pan in which incense is burned; a vessel for burning and wafting incense. Among the ancient Jews the censer was used to offer perfumes in sacrifices, that for the tabernacle being of brass, that for the temple, of gold. Censers, called also thuribles, of various forms are still used in the Roman Catholic Church at mass, vespers and other offices, as well as in some Anglican and other churches. In Shakespeare's time the term was applied to a bottle perforated and ornamented at the top, used for sprinkling perfume, or to a pan for burning any odoriferous substance.

CENSORS, *sen'sorz,* two officers in ancient Rome, whose business it was to draw up a register of the citizens and the amount of their property, for the purpose of taxation; to keep watch over the morals of the citizens, whereby they had power to censure vice and immorality, and to superintend the finance administration and the keeping up of public buildings. The office was the highest in the State, next to the dictatorship, and was invested with a kind of sacred character. The term is now applied to an officer empowered to examine books and, in some countries, articles for the newspapers, before publication. See CENSORSHIP.

CENSORSHIP, until recent times has included only the official authority to examine written or printed matter to determine whether it is proper to be published and circulated. Within a dozen years there has been added in many communities an official scrutiny of theatrical plays and moving pictures, in the interest of public morals, those which were objectionable being revised or refused permits to exhibit.

Censorship of the press is repugnant to free peoples, except when public security is imperiled. In time of war it might be disastrous to print information as to troop movements, defenses, munitions or even food supplies; patriotic people never complain in such circumstances. During the World War all mail matter originating in England and France and all matter passing through those countries was subjected to rigid censorship, that no information of value might reach the enemy. This task required the services of thousands of readers and translators. The Central Powers also exercised like supervision of mail matter.

There is permanent censorship of the press in some European countries. In Germany, for example, before 1919, under the Empire, papers could not print what the authorities prohibited, usually for political reasons.

CENSUS, *sen'sus,* an enumeration of the inhabitants of a country, accompanied by such other information regarding them as may be desired. The most complete census reports gathered in the world are those collected by the United States. The first American census, in 1790, reported little else than the number of people in each of the states; gradually it was expanded to vast proportions requiring each time a dozen large, closely-printed volumes to contain the records. Population, agricultural reports, vital statistics, finances of cities, manufactures, mining, and information on lesser matters are a part of each census report. The United States census is taken every tenth year, the latest having occurred in 1910. Many states have separate censuses, taken each time about five years after the national enumeration.

Canada's census, carefully compiled though lacking the completeness of its neighbor's at the south, is also taken every tenth year, the last enumeration having been in 1911. England's last census was in the same year, and it occurs every tenth year. This same policy prevails over all of Western Europe.

South American countries are more lax. Previous to 1900 Bolivia had not had a census since 1854. Brazil, Argentina and Chile, the leading South American nations, are setting a good example to their more backward neighbors; with them decennial censuses are the rule. In Asiatic countries, excepting India, the taking of the census is attended with considerable difficulty, but population reports are fairly accurate.

CENT, *sent,* the name, with variations to fit the different languages employed, of a small coin in various countries, so called because it is equal to a hundredth part of some other coin. In the United States and

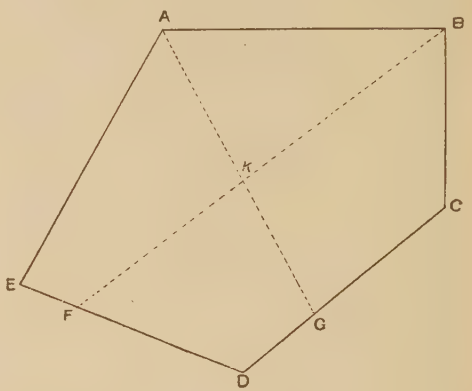
in Canada the cent is the hundredth part of a dollar. In France the *centime* is the hundredth part of a franc. Similar coins are the *centavo* of Chile and the *centesimo* of Italy and Peru. Cents or centimes, and their equivalents, are written simply as decimal hundredths of the unit of value. See COINS, VALUE OF FOREIGN.

CENTAUR, *sen'tawr,* in Greek mythology, a fabulous being represented as half man, half horse. The centaurs were supposed to dwell in the wilds of Thessaly. The Greeks were fond of portraying in art a legendary battle between the centaurs and the retainers of a certain king whose bride the centaurs attempted to capture. Chiron (which see) was the most famous centaur.

CENTAURUS, *sen tawr'us,* a constellation of the southern hemisphere in which occurs Alpha, the third brightest star in the heavens. Astronomers estimate that it takes 4.4 years for the light of this star to reach the earth, and it is therefore the nearest star to the earth. In mythology Centaurus was chief of the centaurs (see CENTAUR) and was accidentally killed by Hercules. Jupiter then placed him among the stars.

CENTENNIAL EXPOSITION, *sen ten'ni al ex po zish'un,* an exhibition of arts, manufactures and products, held at Fairmount Park, Philadelphia, in the summer of 1876, to commemorate the one-hundredth anniversary of the achievement of independence by the United States. It was the first international exhibition held in America. Its site comprised an area of 236 acres, within which about 200 buildings were erected, the largest of which, the main building, was nearly 2,000 feet long and 464 feet wide. Other important buildings were Machinery Hall, Agricultural Hall, Horticultural Hall and Memorial Hall. The last named was constructed of permanent materials and is now used as a museum. Nearly fifty foreign governments were represented in the exhibits, and nearly ten million people were admitted to the grounds, the largest number for a single day being present on Pennsylvania Day (September 28), when 274,919 persons entered the grounds. Special services were held on the opening day, May 10, and on July 4, in honor of the Declaration of Independence. The exhibition was important in that it disclosed to Americans the superiority of some European products, and thus stimulated increased effort for improvement in American goods; and it also opened the eyes of Europeans to the fact that in the New World a manufacturing and commercial nation was developing which threatened European industrial supremacy.

CENTER OF GRAVITY, that point in a body from which the body can be suspended or poised, theoretically or actually, in equilibrium. It is the exact center of weight of the body.



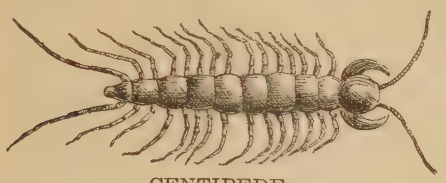
The center of gravity may be found by suspending a body so that it will move freely, first from one point, and then from another, and attaching a plumb line at the point of suspension. The point at which the paths made by the plumb line cross is the center of gravity. In the figure, *ABCDE* represents an irregular body. The center of gravity is found by suspending the body from *A* and marking the path of the plumb line, which takes the direction *AG,* then by suspending it from *B* and marking the path taken by the plumb line, *BF. K,* the point of intersection, is the center of gravity. The center of gravity of a circular body, such as a ring, is outside the body.

A pyramid may not easily be tipped over, because its center of gravity is near its base. A load of hay is more easily tipped, for its center of weight is far from its base, the bottom of the wheels of the wagon. See GRAVITATION.

CEN'TIGRADE SCALE. See THERMOMETER.

CENTIMETER, *sen'ti me t'r,* in the Metric system of measurements, is the hundredth part of a meter. The length of a meter being 39.37+ inches, a centimeter equals slightly less than two-fifths of an inch, or 0.3937 of an inch. The abbreviation for centimeter is *cm.* See METRIC SYSTEM.

CENTIPEDE, *sen'ti peed,* a creature which has many feet and a body consisting of numerous similar rings or segments, each of which bears a pair of legs. The common centipede, found in the United States, is quite harmless, but some species of tropical



CENTIPEDE

countries inflict severe and often dangerous bites. Some of the latter species grow to a length of eighteen inches. They are savage animals and defend themselves energetically. The name means *having a hundred feet,* but in reality no species known has more than thirty-one pairs of legs.

CENTRAL AMERICA, that portion of the North American continent which lies between Mexico, on the north, and Colombia, South America. It contains the republics of Guatemala, Honduras, Salvador, Nicaragua, Costa Rica and Panama and the British colony of British Honduras, or Belize.

Each of these is described in detail in its alphabetical place in these volumes.

Central America covers an area of about 181,500 square miles, or about three times that of Georgia. The surface is generally mountainous, having volcanoes as high as 13,000 feet in the north and 11,000 feet in the south, and many high plateaus. The more important rivers are the Usumacinta, Grijalva, Ulua, Escondido, Wanks and San Juan. There are two large lakes, Nicaragua and Managua. The climate is hot and moist along the coast, but it is dry in the high regions. In the regions along the Atlantic there are luxuriant forests, producing mahogany, logwood, palms and tree ferns. Agriculture is the chief pursuit, and the leading products are cocoa, coffee, India rubber, indigo, mahogany and fruits.

The shores of Central America were first seen by Columbus in 1502. The inhabitants were divided into small tribes, who were in constant warfare with one another. In 1524 Pedro de Alvarado, a Spaniard, succeeded in gaining control over most of Guatemala and Salvador. Between 1524 and 1525 Cortez invaded the country and finally overcame the rest of the tribes. In the sixteenth century Central America and Chiapas formed the captain-generalcy of Guatemala until 1821, when Guatemala proclaimed its independence. Two years later the five divisions, corresponding to the five states, constituted themselves into the Republic of the United States of Central America, but in 1839 the union was dissolved. In 1850, Honduras, Salvador and Nicaragua attempted to restore the republic, but were unsuccessful. Because of the frequent political revolutions, the progress of these countries has been much retarded. Through colonization, British Honduras, or Belize, was established in 1850.

CENTRAL FALLS, R. I., a suburb of Providence, four miles north, on the Blackstone River and on the New York, New Haven & Hartford Railroad. It is an important manufacturing city, and produces cotton, silk and woolen goods, glass and machinery. There are several parks and a public library. The city was incorporated in 1895. Population, 1910, 22,754; in 1917, 26,101 (Federal estimate).

CENTRA'LIA, Ill., founded in 1853 and incorporated in 1859, in Marion County, sixty-two miles east of Saint Louis, on the Illinois Central, the Chicago, Burlington & Quincy, the Illinois Southern and the Southern railroads. The city is important industrially; it has railroad shops and manufactures of envelopes, ice, flour, shirts, overalls and boxes. There are large coal mining interests, also. There is a city hall, a hospital and a Carnegie Library. Population, 1910, 9,680; in 1917, 11,838 (Federal estimate).

CENTRA'LIA, Wash., in Lewis County, midway between Seattle and Portland, Ore. The city is in a coal-mining region and has clay deposits. It is served by the Great Northern, the Northern Pacific, the Centralia Eastern and the Oregon & Western railroads. There is a Carnegie Library, and there are manufactures of lumber and dairy products. Population, 1910, 7,311.

CENTRIFUGAL, *sen trif'u gal,* **FORCE,** the tendency of every moving body to move in a straight line. Whenever a body is compelled to move in a curved path it seems to be pulling away from the center of revolution, and this pull from the center is called *centrifugal force.* It is exemplified in the water thrown off from the rim of a wet grindstone when it is turning, and in the

mud which flies off from the wheel of a vehicle running on a muddy street. It is centrifugal force also that keeps the water from spilling when a pail of water is rapidly swung over one's head. This force is used to practical advantage in the cream separator.

CENTRIPETAL, *sen trip'e tal*, **FORCE**, the force which is directed inward toward the center of curvature and forces a body to move in a curved path. It is thus the force that counteracts centrifugal force, explained above. Centripetal force keeps the revolving grindstone from flying to pieces. Gravity is the great centripetal force of the rotating earth.

CENTURY PLANT. See AGAVE.

CEPHALOPODA, *sef a lop'o dah*, the scientific name of the highest class of mollusks, given them because of the fact that their arms or limbs are arranged in a group about the mouth. The name means *head-footed.* Most of them have a head more or less distinct from the rest of the body, and have complicated organs of digestion. In some species the arms are very numerous, while in others there are only a few.

Related Articles. Consult the following titles for additional information:

Cuttlefish	Octopus
Nautilus	Squid

CERAMIC, *se ram'ik*, **ART.** See POTTERY.

CERBERUS, *sur'be rus*, in classical mythology, the dog of Pluto, which guarded the entrance to Hades. Some accounts gave it a hundred, and some fifty, heads, but three was the popular number. The dog's tail and mane were snakes, and his jaws dripped with foam. The last of the labors of Hercules (which see) was his capture of the monster.

CEREALS, *se're alz.* See GRAINS.

CEREBELLUM, *ser e bel'lum*, THE, that portion of the brain below the posterior lobes of the cerebrum occupying the lower back part of the cranium. The cerebellum weighs about one-eighth as much as the cerebrum, but it is proportionately larger in infants and the lower animals. The white matter of the cerebellum is located on the inside, the gray matter on the outside. The convolutions are very numerous and lie in narrow, transverse folds, separated by numerous deep fissures, placed very closely together; they appear to possess very little of the distinctive character of the fissures and convolutions of the cerebral hemispheres. The surface of the fissures is composed entirely of gray matter, and running toward this from the interior of the cerebellum is the white substance, arranged

CERES, OR DEMETER

in a branching manner and called, therefore, Arbor Vitae, or *tree of life.* The functions of the cerebellum are to coördinate and harmonize those muscles used in walking and standing, running, jumping and other voluntary movements.

The cerebellum is illustrated in the article BRAIN.

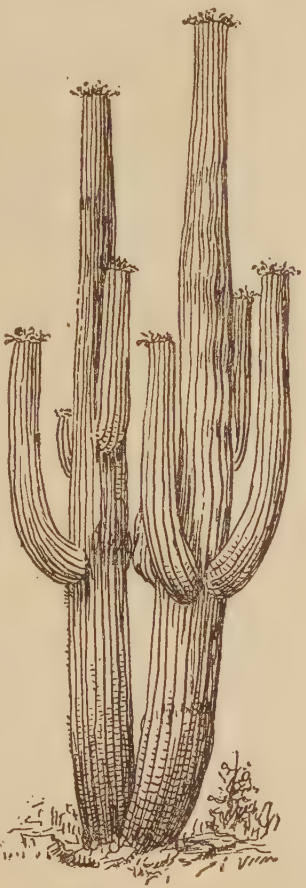
CEREBRUM, *ser'e brum*, THE, the largest portion of the brain. It is divided into lateral and symmetrical hemispheres. The outer surface, composed entirely of gray matter, or *cortex*, is arranged into lobes and convolutions separated by fissures, as shown in an illustration in the article BRAIN. The cortical layer is composed of alternate strata of gray and white matter, the entire layer being about one-sixth of an inch thick. The true interior of the cerebrum is composed of white matter. There are five great lobes, separated by fissures varying from half an inch to one inch in depth. The lobes are divided into many convolutions by secondary fissures running into those already mentioned. The importance of a study of the convolutions is becoming increasingly obvious, for experimental science has demonstrated that the gray matter found in each convolution presides over some definite function or portion of

the body; thus it is a fact not to be questioned that certain convolutions in the frontal lobes control the function of speech; certain others control the motions of the head and extremities on the opposite side of the body.

CERES, *se'reez.* See PLANETOID.

CERES, *seer'eez,* a Roman goddess, daughter of Saturn and Rhea, and mother of Proserpina, or Persephone. She was the goddess of the earth, in its capacity of bringing forth fruits, and especially did she watch over the growth of grain and other plants. When her daughter was stolen and carried off to Hades Ceres neglected the earth during her search for her daughter, and all vegetation perished. The Romans celebrated in honor of Ceres the festival of the *Cerealia,* and the sacrifices made to her consisted of pigs and cows. Ceres was always represented in full attire, her attributes being ears of corn and poppies. The Greek goddess who corresponded to the Roman Ceres was known as Demeter. See MYTHOLOGY.

CEREUS, *se're us,* a large genus of the cactus family, containing about 200 species, of which the *night-blooming cereus* is best known, for the literary allusions to it and the sentiment which surrounds it. Another familiar species is the *old-man cereus,* so called from the long gray hairs which cover the top of the stem. But more remarkable is the *giant cactus* of Arizona, which having grown to a height of fifty feet in a naked, leafless column, then crowns each column-like branch with a bunch of great flowers. See CACTUS.



GIANT CACTUS

CE'RIUM, a metallic element that occurs in many minerals found in Sweden, and a mineral found in North Carolina. Cerium is of a grayish color, is ductile and malleable, and is from five to six times as heavy as water. One of its salts is used to produce a deep, blue-black color on fabrics.

CERRO GORDO, *ser'ro gor'do,* BATTLE OF, a battle in the Mexican War, fought April 17 and 18, 1847, between a force of 12,000 Mexicans, under Santa Anna, and an American force of 8,500, under General Taylor. The pass of Cerro Gordo had been fortified by Santa Anna, with the exception of one bluff which overlooked his position. Taylor occupied this height and opened fire with heavy guns upon the Mexican fortifications, at the same time making a vigorous attack upon the rear of Santa Anna's position. The Mexicans were soon compelled to flee.

CERTIORARI, *sur she o ra're,* WRIT OF. See WRIT.

CERVANTES SAAVEDRA, *ther vahn' tays sah ah vay'drah,* MIGUEL DE (1547–1616), the greatest of Spanish novelists, the author of DON QUIXOTE. He was born at Alcala de Henares and removed thence to Madrid at the age of seven. He early commenced writing verses, and his pastoral *Filena* attracted the notice of Cardinal Acquaviva, whom he accompanied to Italy as page. In 1570 he served under Colonna in the war against the Turks and African corsairs, and in the Battle of Lepanto he lost the use of his left hand. After this he joined the troops at Naples, in the service of the Spanish king, winning the highest reputation as a soldier. In 1575, while returning to this country, he was taken by pirates and sold in Algiers as a slave. For five years he remained in captivity, displaying great courage in the face of constant danger of torture; but at length his friends and relations ransomed him and he rejoined his old regiment.

In 1583 he retired from service and recommenced his literary work, publishing in 1584 his pastoral *Galatea.* In the same year he married, and then for a long time he lived by writing for the stage, to which he contributed between twenty and thirty plays, only two of which have survived.

From 1588 to 1599 he lived in retirement at Seville, where he held a small office. He did not appear again as an author till 1605, when he produced the first part of *Don Quixote*. This work had as its immediate aim the satirical treatment of the sentimental novels of chivalry, then popular, but it contained such accurate pictures of human types and such a fund of delightful humor that it made its author famous at once. Between 1613 and his death were published his twelve *Exemplary Tales, Journey to Parnassus* and eight new dramas. The second part of *Don Quixote* was also completed during these years. See DON QUIXOTE.

CERVERA Y TOPETE, *ther va'rah e to pa'ta,* DON PASCAL DE (1839–1909), the Spanish admiral who commanded the Spanish fleet at the Battle of Santiago. He was graduated from the San Fernando Naval Academy. During the Cuban rebellion in 1868 he had charge of the blockade of the coast, but later became secretary of the navy in Spain. Upon the outbreak of the Spanish-American War, he commanded a squadron consisting of four cruisers and three torpedo boats, which was sent to American waters. It entered the harbor at Santiago de Cuba about May 19 and was there blockaded by American vessels under Admiral Sampson. On July 3, under orders, he made a reckless dash for freedom, and in a running engagement all of his vessels were sunk or destroyed and he himself was taken prisoner. On his return to Spain in September of that year he was court-martialed, but was acquitted of blame for the defeat.

CETACEA, *se ta'she a,* an order of sea animals surpassing in size all others in existence. The largest of animals of the ocean, the whale, belongs to this group, as do also the porpoise and the dolphin. The word cetacea is from the Latin *cetus,* which means *whale.*

The members of this order are true mammals; they have warm blood and breathe by means of lungs, for which purpose they come to the surface of the water to take fresh supplies of air. The body is fishlike in form, but ends in a tail which is expanded into horizontal flukes. There are no hind limbs, and the fore limbs are broad paddles, or flippers, enclosed in a continuous sheath of thick skin. The fishlike appearance is further increased by a fin on the back, but this is a simple fold of skin and does not contain bony spines. The right whale and its allies have no teeth in the full-grown state, but, instead, have triangular plates of baleen or whalebone, which are developed on ridges across the palate. The nostrils open directly upward on the top of the head and are closed by valves of skin, which are under the control of the animal. When a cetacean comes to the surface to breathe, it blows the air out violently, and the vapor it contains, becoming condensed into a cloud, resembles a column of water and spray. As a protection against the cold, the animal is covered by a thick coating of blubber underlying the skin.

Related Articles. Consult the following titles for additional information:

Dolphin	Porpoise
Narwhal	Whale

CETTINGE, *tset'en yay,* the capital of Montenegro, a quiet little town situated in a deep valley about 2,000 feet above the Adriatic Sea. There are no pretentious buildings; even the royal palace is one story in height. Cettinge has little commercial or industrial importance. In January, 1916, during the World War, it was captured by the Austrians, and was held by the Central Powers until the close of the war, in 1918 (see MONTENEGRO). Population, about 5,500.

CEVENNES, *sa ven',* a chain of mountains located in the southeast of France, extending from the Pyrenees in the southwest to the Vosges in the northeast. The Côte d'Or range is sometimes considered a part of it, sometimes a part of the Vosges system. The length of the chain, exclusive of the Côte d'Or, is about 330 miles, the average height not more than 3,000 feet. The highest peak is Mézenc, 5,753 feet above the sea. The Cevennes furnished shelter for the Waldenses, Albigenses and Camisards in their days of persecution.

CEYLON, *se lon',* a beautiful tropical island, between 6° and 10° north of the equator, called in literature the "Pearl of the Orient." It is separated from the mainland of British India, at its southern extremity by Palk Strait, about fifty miles wide. The island is 267 miles long from north to south, and 137 miles in greatest width. Its area is 25,333 square miles, a little more than three times that of Massachusetts. Its population in 1911 was 3,592,883; estimated, 1916, to be 4,260,700. Over half of the people are Singhalese, and

more than one-fourth are Tamils. There are only 8,000 Europeans.

There is a greater acreage of rice than of any other agricultural product; tea is second in importance. Greater than either of these in acreage is that devoted to cocoanut palms, for about every sixteenth acre in the entire island is given to cocoanut culture. Besides these three great sources of revenue there is cultivation of cinchona, cinnamon, tobacco and rubber. The surface of the island is so mountainous that not half of it is subject to cultivation. There are over 2,000 gem quarries, producing sapphires, moonstones, rubies and cat's-eyes, and there is a good deal of gold, thorium and mica.

The climate is tropical, but in the high regions it is very pleasant and cool. The mineral resources of Ceylon are considerable, including precious stones—rubies and sapphires—gold, iron and plumbago. There are three harbors, Galle, Colombo and Trincomalee, the last being one of the finest in the world. The railway lines have a length of 672 miles, and are for the most part operated by the government; a great bridge is to connect Ceylon with the mainland across shallow Palk Strait.

Ceylon since 1831 has been governed by a British governor, assisted by an executive council of seven members and a legislative council of twenty-one members. There are nine provinces, each under the control of a government agent. The capital is Colombo.

In 543 B. C. the original inhabitants, the Yakkas, were conquered by the Singhalese. In A. D. 1200, the Malabars conquered the country, but later it was partly retaken by the Singhalese. The Portuguese came in 1505 and in 1517 began their settlements. These were reduced by the Dutch in the seventeenth century, and the Dutch were driven out by the British in 1795. Ceylon is one of the most prosperous of British colonies.

CHAD, also spelled TCHAD, *chad,* a great lake in Central Africa, almost within the great Sahara Desert. Although it has decreased greatly in size within recent years by evaporation, having once contained 100,000 square miles, it is yet one-half as large as the state of Kentucky—about 20,000 square miles. It lies at the northern borders of Nigeria and Kamerun, in French West African territory, but within the sphere of influence of Great Britain, also. It receives the water of three rivers, but has no visible outlet; there is apparently an underground flow.

CHADWICK, GEORGE WHITEFIELD (1854–), an American musician who ranks popularly next to MacDowell as a composer. He received his early musical education in America, but later studied with the best European masters. Chadwick returned to America in 1880 to enter the New England Conservatory as instructor, and later became its director. Among his important compositions are the oratorio *Judith* and the music for the *Columbian Ode,* sung at the opening of the World's Fair in Chicago. He conducted the annual Worcester Music Festival for many seasons.

CHAF'FINCH, a beautiful European finch, very common in England, where its haunts are chiefly gardens and shrubberies, hedgerows and plantations. The male, which is six or seven inches in length, has a chestnut back, reddish-pink breast, and throat and a yellowish-white bar around the wings. The chaffinch feeds on seeds, insects and their larvae. It has a strong voice that in the wild state is not pleasant, but it can be taught to sing very beautifully and almost to articulate words.

CHAGRES, *chah'gras,* **RIVER**, the main river in the republic of Panama, and especially important henceforth as the source of water supply to operate the locks on the Atlantic side of the Panama Canal (which see). The river rises in San Blas Mountains; its general direction is northwest, and its waters reach the Caribbean Sea west of Colon.

CHAIN, a series of links of metal, joined together. The metal used is iron, steel, brass or bronze, or, if the chain is for ornamental purposes, gold or silver. Small iron chains are made by winding wire, when cold, into a spiral, then cutting off each coil with shears. The separate coils form the links of the chain, which are then welded together. In making large chains the iron is cut into bars, each long enough for a link. These are then shaped and welded, largely by machinery. The steel is rolled into bars especially for the purpose, and the machine cuts away the metal so as to leave the links, much as a boy would cut away the wood in making a wooden chain. Ma-

chine-made chains are lighter and stronger than those made by hand. A small chain is proportionately stronger than a large one, because small wire has proportionately greater strength than large wire.

CHAIN, in surveying, a unit of measure consisting of 100 *links*, each 7.92 inches in length, having a total length of 4 rods, or 66 feet. 100,000 square links make 1 acre. It is often called *Gunter's chain*, from its inventor, Edmund Gunter. The table of surveyor's measure is as follows:

7.92	in.	=	1 link (l.)
25	l.	=	1 rod (rd.)
4	rd.	=	1 chain (ch.)
100	l.		
80	ch.	=	1 mile (m.)

CHALCEDONY, *kal sed'o ni*, a variety of quartz, so called because it was first found in abundance near Chalcedon, in Bithynia. There are many different kinds of chalcedony, known variously as agate, onyx, chrysoprase, sard, carnelian and sardonyx. The common form, also called white agate, has the appearance of milk diluted with water. It is semitransparent, and is more or less clouded with spots. Polished chalcedony is employed in making various forms of jewelry and ornamental articles. In Chalcedony Park, Arizona, there is a forest of fossil trees, the wood fibers of which have been replaced by a chalcedony deposit from water.

CHALDEA, *kal de'ah*, an ancient district southeast of Babylonia, on the Persian Gulf, and notable in early Bible records. Little is known of its history, except that its inhabitants were a warlike people who preserved their independence at all times. At various periods in the early history of Babylonia, Chaldean princes sat on the throne, but it was toward the end of the seventh century B. C., after the Chaldean, Nabopolassar, overthrew the Assyrian rule and founded the New Babylonian kingdom, that Chaldea became supreme in Mesopotamia. Nabopolassar's son Nebuchadnezzar was the greatest of this dynasty, which closed 556 B. C. Hebrew and classical writers, not only of this period but of later times, use the names Babylonian and Chaldean synonymously. See BABYLON; BABYLONIA.

CHALDEE, *kal'de*, LANGUAGE, a name often given to the Aramean language, one of the principal varieties of the ancient Semitic. Chaldee literature is usually arranged in two divisions: the Biblical Chaldee, or those portions of the Old Testament which are written in Chaldee, namely, certain chapters in *Daniel*, *Ezra* and *Jeremiah* and the Chaldee of the *Targums* and other later Jewish writings. Chaldee was presumably the language of Abraham before his migration to Palestine. See ARAMAIC.

CHALEURS, *sha lur'*, BAY, an inlet of the Gulf of Saint Lawrence, which partially separates New Brunswick from the province of Quebec. Its length from east to west is 185 miles and its greatest width is twenty miles. The water is deep, and the bay affords good anchorage for sea-going vessels. Fishing is the chief industry in the towns along the banks. This inlet was discovered and named by Jacques Cartier, in 1535. The name means *bay of heat*, and was suggested to Cartier because he entered the inlet in the hottest month of the year.

CHALICE, *chal'is*, the name originally given to any drinking cup, but now used to designate especially the vessels that hold the wine in the holy sacrament. The earliest chalices were made of wood or horn; later ones were of glass and crystal, and in the Middle Ages gold, silver and other precious metals were used. Many of them were adorned with most elaborate designs in enamels and precious stones. The shapes have varied as much as the style of ornamentation.

CHALK, *chawk*, a variety of limestone formed almost wholly of the shells of minute marine animals, known as *foraminifera* (which see). It is usually white or gray, coarse-grained and so soft that it cannot be polished. Impurities, however, sometimes give it other colors. It is used in the manufacture of cement, for making lime for whitewash, and for marking on blackboards; when prepared for the last named purpose it is ground and pressed into slender sticks.

Chalk is found in large quantities in various parts of the world. It forms the white cliffs that border the English channel and to whose color England owes its ancient name of *Albion*. It extends into Northern France, and over the chalk hills of Flanders the contending armies in the World War fought desperately. The trenches dug for protection were cut from the chalk deposits in many places. In the United States large quantities are found in Arkansas, Iowa, Montana, Texas and some

CHALDEA ASSYRIA PERSIA

ASSYRIAN PRINCE

ASSYRIAN SPEARMAN

SCALE OF MILES FOR BOTH MAPS

0 100 200 300 400 500

ASSUR
The Chief Assyrian Deity

CUNEIFORM WRITING

CHRONOLOGICAL SUMMARY

CHALDEA AND BABYLONIA

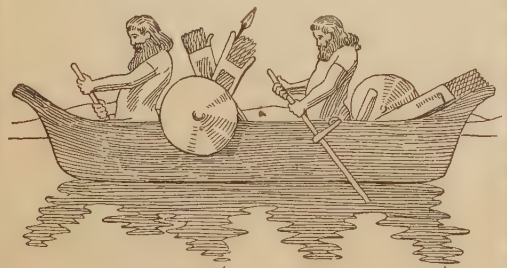
SARGON, KING OF CHALDEA	3800 B.C.
BABYLON BECOMES THE POLITICAL CENTER ABOUT	2400 B.C.
CHALDEA CAPTURED BY ASSYRIANS	2286 B.C.

ASSYRIA

TIGLATH-PILESER I	1130 B.C.
ASSUR-NAZIR-PAL	883 B.C.
TIGLATH-PILESER II	745 B.C.
TEN TRIBES OF ISRAEL CAPTURED	722 B.C.
SENNACHERIB	701 B.C.
ESARHADDON	680 B.C.
ASSUR-BANI-PAL	668 B.C.
FALL OF NINEVEH	606 B.C.

PERSIA

CYAXARES, KING OF PERSIA	625 B.C.
NINEVEH CAPTURED BY MEDES	606 B.C.
NEBUCHADNEZZAR	604 B.C.
CYRUS CAPTURES BABYLON	538 B.C.
DARIUS I.	522 B.C.
PERSIANS DEFEATED AT MARATHON	490 B.C.
XERXES DEFEATED AT THERMOPYLAE	480 B.C.
BATTLE OF ARBELA	331 B.C.



A PERSIAN BOAT (As Shown on Old Monuments)

TOMB OF CYRUS THE GREAT

H.M. HAINES

other states. The Texas belt is over 250 miles in extent and is nowhere less than 600 feet thick.

CHAL'LENGER EXPEDITION. In 1872 the British government sent the *Challenger*, a corvet of a little more than two thousand tons burden, on a long trip around the world, for the purpose of sounding the depths of the ocean, mapping the basins and studying the life of the Atlantic, Southern and Pacific oceans. The *Challenger* spent nearly four years on this expedition and traveled nearly 70,000 nautical miles; it made investigations at 362 stations, making the deepest soundings in March, 1875, at 4,575 fathoms. See FISHES, DEEP SEA.

CHALONS, *shaloN'*, BATTLE OF, one of the great decisive battles of history, fought in Gaul in A. D. 451, near the modern French city of Châlons-sur-Marne. The battle was fought between a Roman allied army under Aetius, and a great force of Huns commanded by Attila. The Romans and their allies won the day, and saved Europe from the domination of the barbarians. It is significant that two decisive battles of the World War were fought in the same valley. In 1914 Paris was saved by the German defeat along the Marne, and in 1918 the Germans were again checked along this river at a time when Paris was again seriously threatened. See MARNE, BATTLES OF THE.

CHAMBERLAIN, *chaym'bur lin*, the family name of two eminent English statesmen, father and son.

Joseph Chamberlain (1836–1914) won renown as one of England's greatest Colonial Secretaries. He entered Parliament in 1876 as a representative of Birmingham, and under Gladstone's premiership he became President of the Board of Trade and a Cabinet Minister. Though at that time a Liberal, he later broke with Gladstone because of the latter's advocacy of Home Rule, and after 1886 he was one of the most pronounced members of the Liberal-Unionist party. He was in America in 1887 as one of the British representatives appointed to negotiate a settlement of the fishery disputes between Canada and the United States.

In 1895 he entered the Cabinet of Lord Salisbury as Secretary of State for the Colonies. From this time on Chamberlain worked zealously for the promotion of a closer union between the mother country and the colonies, and he was the leading figure in the movement for tariff reform. He proposed the imposition of duties on goods from foreign countries, that the colonies might enjoy trade preferences, and on this issue the Liberal-Unionists went down to defeat in the elections of 1905. Chamberlain, however, sat in Parliament and continued to advocate this policy until his death.

[**Joseph**] **Austen Chamberlain** (1863–), oldest son of Joseph Chamberlain, entered Parliament in 1892. From 1895 to 1900 he held the position of Civil Lord of the Admiralty, and from 1900 to 1902 was Financial Secretary to the Treasury. In Balfour's Cabinet he served as Postmaster-General and Chancellor of the Exchequer, and after 1906 took his father's place as active leader of the tariff reformers. In 1913 Chamberlain was made chairman of the royal commission on Indian finance, and in May, 1915, he became Secretary of State for India in Asquith's coalition Cabinet. This position he resigned in 1917. He was returned to Parliament in the general election of December, 1918, and when Lloyd George formed a new Cabinet, in January, 1919, he appointed Chamberlain Chancellor of the Exchequer.

CHAMBER OF COMMERCE, a board chosen from among the merchants and traders of a city to protect the interests of commerce; to lay before the legislature the views of their members on matters affecting commerce; to furnish statistics as to the trade of the locality, and to attain by combination advantages which could not be reached by individual enterprise. A system of international chambers of commerce, for promoting relations with foreign countries, has been largely adopted. Nearly every city has a chamber of commerce, which is usually the most important factor in its commercial life.

In large cities bodies called chambers of commerce exist for another purpose. They buy and sell stocks and bonds of railroads and industrial enterprises, furnishing a market always where buyers and sellers can dispose of or come into possession of securities.

CHAMBER OF COMMERCE OF THE UNITED STATES, an organization to promote the nation's business interests, formed at a conference called by President Taft in 1912. Its membership is composed of members of local chambers of commerce and other business men's associations. The organization studies business prospects, fluctuations, dangers and opportunities, statistics of pro-

duction and of labor, and it watches legislation in Congress which affects business. Reports of all these activities are made to the membership. The national headquarters are in Washington, D. C.

CHAMBERS, *chaym'berz,* ROBERT WILLIAM (1865–) an American novelist who has gained a wide circle of readers. In 1918 the advertisements for his *Restless Sex* carried the statement that this was his forty-eighth book. His novels are generally romances of modern society, and they deal rather frankly with some of the unwholesome aspects of that phase of life. On the whole they are not to be recommended to young people. Chambers was an illustrator before he became a novelist, and after a course of study at the Julien Academy at Paris he made sketches for *Life, Truth, Vogue* and other periodicals. The titles of his books include *The Fighting Chance, The Firing Line, Ailsa Page, The Common Law, The Business of Life, The Girl Philippa, Barbarians, The Moonlit Way, In Secret* and *The Crimson Tide.* Some of these have been reproduced in moving pictures.

CHAMBERSBURG, PA., the county seat of Franklin County, about fifty miles southwest of Harrisburg, on the Conococheaque Creek and on the Cumberland Valley, the Western Maryland, the Philadelphia & Reading and other railroads. It has Wilson College (Presbyterian), for women, Penn Preparatory School for Girls, a fine courthouse, a public library, a memorial fountain, an old people's home and a children's home. There are railroad shops and manufactures of shoes, hosiery, flour, furniture, engines and other articles. The place was settled by Benjamin Chambers in 1730 and was first known as Falling Spring; it was incorporated in 1803. Population in 1910, 11,800; in 1917, 12,475 (Federal estimate).

CHAMELEON, *ka me'le un,* a genus of lizards, natives of the Old World, but found also in the Southern United States and the West Indies. The best-known species has a naked body six or seven inches long, and feet and tail all suitable for grasping branches. The skin is cold to the touch and contains small grains which in the shade are of a bluish-gray color, but which in the light of the sun become a grayish-brown or tawny color.

The chameleon possesses the curious power, however, of changing its color, either in accordance with its surroundings or with its temper, when disturbed. Its power of fasting and habit of inflating itself gave rise to the fable that it lived on air, but in reality it feeds upon insects, taking its prey by rapid movements of a long, sticky tongue. In general habit chameleons are dull and sluggish. They are often kept as pets.

CHAMINADE, *sha me nahd',* CECILE LOUISE STEPHANIE (1861–), a French composer who is noted for the charm and originality of her work. At eight years of age she had composed sacred music of considerable merit, and after several years of study under eminent teachers she made a successful début in 1879. Thereafter she appeared frequently in concert as a pianist, but devoted herself especially to composition. Probably her best-known instrumental composition is the *Scarf Dance,* but her fame chiefly rests upon her songs, whose quaint melodies and charming accompaniments have made them very popular. The most important are *Berceuse, Rosamonde* and *The Silver Ring.*

CHAMOIS, *sham'my,* a goatlike antelope, living in the high mountains of Europe and Western Asia. It is a rather small animal, with a brownish coat that changes to faun color in summer and gray in the spring. Its head is of a pale yellow color, marked by a black band surrounding the eyes and extending from the nose to the ears. Its horns, which are about six or seven inches long, are round and almost smooth, and they grow straight upward until near the tip, where they suddenly end in a sharp hook that is bent backward. The tail is black. During the feeding time, which is in the morning, one animal is always standing on guard in some prominent place for the purpose of warning the rest of approaching danger. The fleetness of the chamois, the roughness of the mountains which it inhabits, and its powers of smell, make its pursuit both difficult and dangerous. Though the flesh is highly prized as food, the chief value of a chamois lies in its skin, which is used to make the very soft, flexible leather known as *chamois skin.*

CHAMOIS

CHAMOMILE, or **CAMOMILE**, *kam'o-mile*, a well-known plant belonging to the natural order Compositae. It is perennial and has slender, trailing, hairy, branched stems. The flower is white, with a yellow center. Both leaves and flowers are bitter and aromatic. The fragrance is due to the presence of an oil, of a light blue color when first extracted. Both the leaves and the flowers are employed in fomentations and poultices, and also in the form of an infusion. Chamomile is cultivated in gardens in the United States and Canada, and is also found wild, especially in the form of the common troublesome *mayweed*.

CHAMPAGNE, *sham pane'*, a French wine, white or red, which is made chiefly in the department of Marne, in the former province Champagne. It is generally characterized by its property of frothing, or effervescing, when poured from the bottle, though there are also *still* Champagne wines. The creaming or slightly sparkling Champagne wines are more highly valued and command greater prices than the full-frothing wines, in which the small quantity of alcohol they contain escapes from the froth as it rises to the surface, carrying with it the aroma and leaving the liquor nearly tasteless. The property of creaming, or frothing, possessed by these wines is due to the fact that they are partly fermented in the bottle, carbonic acid being thereby produced. Wine of a similar kind can of course be made elsewhere, and some of the German champagnes are hardly to be distinguished from the French. Much artificial or imitation champagne is sold, and an excellent wine of similar nature is made in California. See WINE.

CHAMPAIGN, *sham pane'*, ILL., founded in 1844 and named for an Ohio county, is a city in Champaign County, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Illinois Central and the Wabash railroads, 125 miles southwest of Chicago. Urbana, a sister town, and Champaign possess the University of Illinois (see ILLINOIS, UNIVERSITY OF). The university buildings are imposing, and there are also a local Federal building, a Masonic Temple and several large business buildings. The city has six banks and a public library. Population, 1910, 12,421; in 1917, 14,708 (Federal estimate).

CHAMP DE MARS, *shoN de mahrz'*, meaning *field of Mars*, is a great rectangular space in Paris, over half a mile long and about one-third of a mile in width. It was originally intended, over a century ago, as a place for military drill. To-day it is used also for great expositions. The Eiffel Tower, the famous surviving relic of the exposition of 1889, stands at one end of the field.

CHAMPLAIN, *sham plane'*, a lake lying between New York and Vermont and extending a short distance into Canada. Its length is 125 miles, but its width is only from one to fifteen miles. A branch of the New York State Barge Canal connects it with the Hudson River. The outlet is the Richelieu River, which flows into the Saint Lawrence. The beauty of the lake is enchanced by many small islands, and there are numerous summer resorts. It was on this lake that the Americans won a great naval victory in 1814.

CHAMPLAIN, *sham playn'*, SAMUEL DE (1567–1635), a French explorer whose labors in the upbuilding of Canada won him the title "Father of New France." Born in Brouage, on the Bay of Biscay, he was familiar with the sea from childhood, and before his first voyage to Canada he made several trips to the West Indies and to Mexico. In 1603 he explored the Saint Lawrence River as far as the Lachine Rapids, and the following year, accompanied by Sieur de Monts, he founded Port Royal (now Annapolis Royal, N. S.). Quebec was founded by him in 1608, and the following year he discovered the beautiful lake between Vermont and New York which bears his name.

In 1611 Champlain founded a trading post on ground which later became the site of Montreal. Subsequently he served as lieutenant-governor of the province of New France, and for many years was the very life and soul of French power in the New World. Though compelled to surrender Quebec to the English in 1629, and taken to England a prisoner, he returned to America after the restoration of the colony in 1632, and died in Quebec on Christmas Day, 1635. In his dealings with the Indians Champlain won the friendship of the Algonquins, but thereby incurred the lasting enmity of the Iroquois. The friendship of the latter for the English told against the French later, when the two nations fought for supremacy in North America. See FRENCH AND INDIAN WARS.

CHAMPS ELYSEES, *shahN za le za'* a famous promenade of Paris, extending from the Place de la Concorde to the Place de

l'Etoile, a distance of about one and one-fourth miles. The avenue is lined with beautiful trees and buildings, and at one end is the famous Arch of Triumph (which see) erected by Napoleon.

CHANCEL, *chan'sel*, a term almost synonymous with *choir* and designating the end of the church opposite the entrance, property containing the choir and the sanctuary. The latter term is used to denote the place where the altar or communion table was placed. The chancel was occupied by the clergy and the singers and was divided from the rest of the church by a screen or rail, which in the English, medieval, Russian and Greek churches entirely shut it off from the spectators. In the Gothic churches the chancel corresponded to the apse of the ancient basilicas. See APSE; BASILICA.

CHANCELLOR, *chan'sel or*, an official title used with various applications. In the former German Empire the Chancellor was the leading administrative official, appointed by the emperor and accountable to him alone. Bismarck was the first Chancellor. When the revolution which overthrew the empire occured (1918), the office was held by Prince Maximilian of Baden. The first Chancellor under the republic was Philipp Scheidemann.

In England the Lord Chancellor is the highest judicial officer of the Crown; the Chancellor of the Exchequer is the Minister of Finance, an official corresponding to the American Secretary of the Treasury.

In the United States the term is often applied to the chief judicial officer of separate chancery courts, and also to honorary heads of universities.

CHAN'CELLORSVILLE, BATTLE OF, a famous battle of the Civil War, fought May 1 to 4, 1863, between a Federal army of 100,000, under General Hooker, and a Confederate force of 90,000, under General Lee. The latter were entrenched on the west side of the Rappahannock River. Hooker planned to attack this position on both flanks and dispatched Sedgwick to turn the enemy's right wing, while he himself with another force crossed the river and prepared to attack the left end of the line. The movement was at first successful, and Hooker had occupied Chancellorsville with 45,000 troops before Lee discovered the movement. The latter immediately began an attack, however, and on May 2 "Stonewall" Jackson, with 20,000 Confederates, completely destroyed a Federal corps under General Howard. In this engagement "Stonewall" Jackson was fired upon by mistake by his own troops and was mortally wounded. On the following day the Confederate assault was even more successful, the Federals being completely demoralized and compelled to retreat hastily and in disorder.

CHANCERY, *chan'ser i*. See COURTS.

CHANG-CHOW', CHINA, a walled city in the province of Fu-kien, capital of the department of the same name, thirty-five miles west of Amoy, which is its port. It stands in a valley surrounded by hills and intersected by a river. The streets are broad, paved with granite in the business section and lined with good modern buildings. The most interesting building is a Buddhist temple, built in the eighth century. There are manufactories of silk goods, sugar and bricks, and the city has an extensive trade in tea and sugar. Population, estimated, 800,000 to 1,000,000.

CHAN'NEL ISLANDS, a group of islands in the English Channel, off the west coast of the department of La Manche, in France, consisting of Jersey, Guernsey, Alderney and Sark, with some dependent islets. Their combined area is seventy-five square miles. They have a mild climate and a fertile soil which yields early vegetables and fruits for the London market; and each large island has a breed of noted cattle used for dairy purposes. Granite from Jersey and Guernsey is exported for building purposes. These islands belong to Great Britain, and on account of their strategic importance they have been strongly fortified. They are the only remains of the Norman provinces once subject to England. Population, 1911, 96,900.

CHANNING, *chan'ing*, WILLIAM ELLERY (1780–1842), a famous American preacher and writer, born at Newport, R. I. He studied at Harvard College, became a Unitarian and taught Unitarian doctrines with great zeal and success. His first appointment as a pastor was in 1803, when he obtained the charge of a congregation in Boston. He soon became known as one of the most popular preachers of America. Channing's reputation was still further increased by the publication of writings, chiefly sermons and reviews on popular subjects. Coleridge said of him, "He has the love of wisdom and the wisdom of love."

CHANUTE, *cha noot'*, KANS., a city in Neosho County, 125 miles southwest of Kansas City, on the Atchison, Topeka & Santa Fé and the Missouri, Kansas & Texas railroads. It is an oil and natural gas region where there are over 2,000 wells. Here are railroad shops, glassworks, smelters and oil refineries. The place was settled in 1872 and was incorporated in the next year. Population, 1910, 9,272; in 1917, 12,968 (Federal estimate).

CHAPARRAL, *chap a ral'*, incorrectly spelled *chapparal*, refers to any dense thicket of shrubs or dwarf trees. It is a common term in the Southwestern United States and in Mexico.

CHAPLAIN, *chap'lin*, any person empowered to conduct special religious services, as in an army or for a society. In armies chaplains are given commissions as noncombatant officers. In the United States armies prior to the World War there were sixty-seven chaplains; of these fifteen were majors, and the remainder were captains or first lieutenants, according to length of service. In the navy chaplains rank from lieutenant to captain. The pay varies with length of service, from $2,000 to $4,000 per year. Hundreds of chaplains were commissioned during the World War.

CHAPLEAU, *shah plo'* SIR JOSEPH ADOLPHE, (1840–1898), a Canadian statesman, born at Ste. Therese de Blainville, Quebec, and educated at the college of his native town and at Saint Hyacinthe. He began the practice of law in Montreal, and in 1873 was created queen's counsel. Chapleau became a member of the Quebec legislature, and at the union of the provinces in 1867 became solicitor-general for Quebec. In 1878 he was chosen leader of the Conservative opposition in the Quebec assembly, and the following year was appointed premier of the province. Appointed Secretary of State for Canada in 1882, he continued in this position with the Abbott Ministry. Later, for a short time, he was Minister of Customs, and in 1892 was appointed lieutenant-governor of Quebec. A ready speaker and a keen debater, Chapleau was generally considered the leading French-Canadian orator of his time.

CHAP'MAN, GEORGE (1557–1634), an English poet, the earliest and perhaps the best translator of Homer. The *Iliad* was published in installments from 1598 to 1611; the *Odyssey* appeared in 1614–1615. These translations have been highly commended by such poets as Pope, Keats and Coleridge, and by Lamb, but they have also been criticised somewhat on the score of inaccuracy. Keats's sonnet, *On First Looking into Chapman's Homer*, is well known.

CHAPUL'TEPEC, BATTLE OF, a battle of the Mexican War, fought September 12 to 14, 1847, in the campaign against Mexico City, between 7,000 Americans, under General Scott, and a Mexican force of 25,000, under General Santa Anna. The Americans made a vigorous attack upon the castle, which was captured, together with a force of nearly 1,000 Mexicans.

CHARADE, *sha rade'*, a kind of riddle, the subject of which is a word composed of several syllables, each of which can be taken as a separate word. Each syllable, considered as a separate word, is either described or dramatically represented, and finally the whole word is given a sort of enigmatic definition. The following is an example: "Some one threw my first and second at me, and it hit my third. It did not hurt me, for it was only a branch of my whole." Answer, *Mistletoe*. When dramatic representation is used to indicate the meaning of the syllables and the whole word, the puzzle is called an acting charade. See ENTERTAINING, SUGGESTIONS FOR.

CHARCOAL, a variety of coal obtained by burning wood or bones with a limited supply of air. Wood charcoal is prepared by piling billets of wood in a pyramid form and causing them to burn slowly under a covering of earth, or in a closed kiln. In consequence of the heat, part of the combustible substance is consumed, part is volatilized, together with a portion of water, and there remains behind the carbon of the wood, retaining the form of the tissue. Wood charcoal, well prepared, is of a deep black color, brittle and porous, tasteless and inodorous. A partly burned stick of wood in a fireplace is a good example of charcoal.

Charcoal is insoluble in water and is not affected by it at low temperatures; hence, wooden stakes which are to be immersed in water are often charred to preserve them, and the ends of posts stuck in the ground are often thus treated. Owing to its peculiarly porous texture, charcoal possesses the property of absorbing a large quantity of air or other gases at common temperatures and of yielding the greater part of them

when heated. Charcoal likewise absorbs the odoriferous and coloring principles of most animal and vegetable substances, and hence it is a valuable deodorizer and disinfectant.

It is used as fuel in various arts, where a strong heat is required without smoke. It is used also in the manufacture of gunpowder. In the form of ivory black and lampblack, it is the basis of black paint; and mixed with fat oils and resinous matter, to give a due consistency, it forms printing ink. See BONEBLACK; LAMPBLACK.

CHARD, a form of garden beet cultivated for its leaves, which are eaten as greens, but particularly for the center rib of the leaf. The latter is cooked about the same way as asparagus. Chard is grown in the same way as the garden beet, from which it differs in having small, woody roots.

CHARGE D' AFFAIRES, *shahr zha' da fair'*, a French word meaning *in charge of affairs*, refers to a man who is in temporary charge of a diplomatic post, in the absence of his superior. However, the title is sometimes given to a permanent official in a diplomatic post too unimportant to be dignified with a diplomat of high rank.

CHARGE OF THE LIGHT BRIGADE, a poem by Alfred Tennyson in which the keynote is the familiar passage—

> Theirs not to make reply,
> Theirs not to reason why,
> Theirs but to do and die.

This inspiring ballad commemorates the charge of an English brigade of light cavalry, which was almost wiped out during the battle of Balaklava, in the Crimean War. Through a mistake in giving orders, the "noble six hundred" were commanded to charge the Russian guns at the end of a long valley. Though obedience meant certain death to nearly all, the brigade charged at the word of command, and only a remnant returned. The poem has served to keep alive the memory of the heroic band that so splendidly acted out the maxim, "Obedience is a soldier's first duty." The ballad was first published in 1855. See BALAKLAVA; CRIMEAN WAR.

CHARIOT, an ancient two-wheeled vehicle used in war or in processions of state. It was the first wheeled vehicle used by man. The common form of the ancient chariot was that of a vehicle on low wheels, open behind and at the top, the sides and front being about four feet in height. Chariots were used by the Egyptians, Assyrians, Greeks and Romans. They were strongly and often elegantly built, but were not well suited to speed. Among the ancient nations chariots were of great importance in war. There are a number of sculptures which give a clear idea of the Assyrian chariots. These resemble the Egyptian in all essential features, containing almost invariably three men—the warrior, the shield-bearer and the charioteer. War chariots had sometimes scythelike weapons attached to each extremity of the axle, as among the ancient Persians and Britons. Among the Greeks and Romans chariot races were common, and there is an excellent description of one in Wallace's *Ben Hur*.

CHARITY, SISTERS OF, also known as Sisters of Mercy, the name given to a number of orders of women in the Roman Catholic Church. The first organization was established in France by Saint Vincent de Paul in 1629. The Order was approved by the Pope, and it spread rapidly. The members are forbidden to marry, and they devote their lives to the care of the sick and the destitute and to the protection of homeless children and the aged. The Order has spread wherever the Roman Catholic Church is found, and is one of the strongest, most widely known and generally appreciated organizations within that Church. Because of their self-sacrificing lives and their systematic devotion to assisting the needy, these orders have been spared persecution many times during religious conflicts, and they have been saved by opposing forces when cities in which they were established were besieged and nearly destroyed. There are a number of Orders in America which are popularly known as Sisters of Charity. One of these was founded in Maryland in 1809, under a distinct rule, and has a number of houses in the United States.

CHARITY AND CHARITIES. The instinct to help a fallen brother is not a new thing; it is as old as human nature itself. But organized charity is a product of later civilization. Before the establishment of the Christian Church such a thing as institutional charity was almost unknown. States as a rule did not concern themselves with the care of the deformed, the diseased and the outcast, and in some cases society avoided the burden by deliberately putting these unfortunates to death. With the spread of Christianity and its beneficent teachings of love for one's fellowmen, charitable enterprise became

common in Europe wherever Christian churches were planted. To-day the churches are still important agencies of relief, but the service has broadened immeasurably, because unity of effort has supplemented the independent efforts of separate denominations. Many of the great charity organizations of modern times are undenominational.

In 1869 the first relief society of this nature was organized in London, and since then numerous others have been established in various parts of the world, under such names as Associated Charities, United Charities, Charity Bureau, etc. The first American organization originated in Buffalo, N. Y., in 1877; the example of Buffalo has been followed by about 150 other American cities, and by nearly all the large Canadian cities.

These charity bureaus are supported by voluntary contributions. Boards of directors chosen from the contributors act as administrators, and the work is performed by trained superintendents and their assistants. The work includes investigation, the systematic recording of all information, personal visiting, donation of supplies to needy families, aiding the unemployed to find work, and coöperation with various organizations whose activities connect themselves with relief work. These bureaus are active in interesting communities and city governments in establishing playgrounds, recreation centers, public baths, etc., and they work for legislation relating to social and economic reform.

Soldier of the period

CHARLEMAGNE, *shahr'-le mane*, or **CHARLES THE GREAT** (742–814), the outstanding figure of his age, and one of the greatest characters in all history. He was a king of the Franks and the first of the Holy Roman emperors. Charles Martel was his grandfather and Pippin the Short his father. With his brother Carloman Charles succeeded to the throne, and on the death of Carloman the free vote of the Franks made him sole king.

His reign of forty-six years was filled with wars and conquests, as during that time he undertook fifty-two campaigns, the chief of which were against the Lombards, the Saracens and the Saxons. When Desiderius, king of the Lombards, sought to obtain the succession for the children of Carloman, Charlemagne marched against him, seized all his possessions and placed on his own head the famous "Iron Crown of Lombardy" (774). Before leaving Italy he visited Rome and confirmed the donation made by his father to the Pope, of certain portions of Lombardy. This was the beginning of the papal claims to temporal supremacy. In 777 Charlemagne made an expedition against the Saracens in Spain. He was victorious, but on the return march across the Pyrenees, the rear of his army was attacked by the Gascons and Basques, wild mountaineers of that region, and cut to pieces in the famous Pass of Roncesvalles.

Charlemagne's most frequent and important campaigns were against the Saxons, one of the few pagan German tribes at this time. He was determined to establish Christianity among them at any cost, but for more than thirty years they resisted him. During this struggle, after one of the innumerable revolts, Charlemagne had 4,500 Saxon prisoners put to death at one time. The Saxons at last yielded, and most of the leaders were baptized.

In the year 800 Charlemagne was called to Rome by Pope Leo III to aid him against a hostile faction. The king speedily punished the Pope's enemies, and before leaving Rome was rewarded for his services. During the festivities in the Cathedral of Saint Peter on Christmas Day, Pope Leo approached the kneeling king, placed on his head a crown of gold and proclaimed him emperor of the Romans, the consecrated successor of Caesar Augustus and Constantine.

Charlemagne is famed as a statesman and patron of learning. Under his rule commerce was protected, and robbers who preyed upon traveling merchants were severely dealt with; agriculture was encouraged and improvements were taught to the farmers, the emperor's own estates being a praiseworthy model. Charlemagne formed at his court a school for the nobles and their sons, and he himself learned to read Latin and even Greek, although he could not write legibly. He was married four times, and left one son, who became Louis I, surnamed *The Pious*. Charlemagne's empire, at his death, extended from the Baltic to the Mediterranean, from the Atlantic Ocean to the Danube, thus in-

cluding modern France, Germany, Holland, Belgium, Switzerland, Hungary, a little of Spain and most of Italy. His capital was at Aix-la-Chapelle. After Charlemagne's death the empire was harassed by the Northmen and by internal dissension, until finally, by the Treaty of Verdun in 843, it was divided among his three grandsons, Charles, Lothair and Louis, the divisions made laying the foundations, subject to some territorial changes, of the modern nations, France, Italy and Germany, respectively.

Related Articles. Consult the following titles for additional information:

Charles (France)	Holy Roman Empire
Charles Martel	Iron Crown
Franks	Pepin

CHARLES I, or **KARL I** (1887–), the last emperor-king of Austria-Hungary. His brief and troubled reign lasted from November, 1916, to November, 1918, and his abdication in the latter year was a fulfilment of the often-heard prophecy that after the death of Francis Joseph the dual monarchy would cease to exist. Francis Joseph, great-uncle of Charles, died in 1916 after a reign of sixty-eight years. The heir-apparent, Francis Ferdinand, had been assassinated on June 28, 1914, at Sarajevo, Bosnia. This event precipitated the World War, the horrors of which no doubt hastened the death of the aged emperor-king. His grand-nephew Charles ascended the throne of Austria on November 21, 1916, and was crowned king of Hungary on December 30. As he was known to be liberal in his views and not in sympathy with the war aims of the German militarists, much was expected of him in the direction of securing peace.

The situation, however, was beyond his control. Austria-Hungary was a combination of antagonistic peoples, not a united state, and as the war progressed disunion and discontent increased to such an extent that the dissolution of the dual monarchy could not be averted. In October, 1918, when the Germanic alliance was on the point of collapse, Charles made a last desperate effort to save his throne by proposing a federalization of the states composing the Austro-Hungarian state. Unsuccessful in this attempt, he issued on November 11 a proclamation relinquishing control of the government. While this was not a formal abdication it was regarded as such. The deposed emperor and his family retired to Eckartsau, a small place on the Danube, fifteen miles from Vienna. In March, 1919, they went to Switzerland, hoping there to secure permanent asylum. The former empress, Princess Zita of Bourbon-Parma, was greatly beloved by the people. See AUSTRIA-HUNGARY; WORLD WAR.

CHARLES I (1600–1649), king of Great Britain and Ireland, son of James I. He married Henrietta Maria, daughter of Henry IV of France, and in 1625 succeeded to the throne. He was the first of the House of Stuart. After dissolving three Parliaments, because they would not grant him money unconditionally, he concluded to reign alone. This he did for eleven years, using the arbitrary courts of High Commission and Star Chamber as a kind of cover for pure absolutism, and raising money by unconstitutional or doubtful means. His attempts to introduce an Anglican liturgy into Scotland produced violent tumults, and gave origin to the famous *Covenant* in 1638, to oppose the king's design. An army was sent north, but was defeated by the army of the Covenanters, and in 1640, to secure funds to put down the Scottish insurrection, Charles was compelled to summon Parliament.

The body which assembled at that time became the famous Long Parliament, for it continued its sessions for twelve years. Charles agreed no better with this assembly than he had with the earlier Parliaments, and matters soon came to open rupture. The king had on his side the great bulk of the gentry, while nearly all the Puritans and the inhabitants of the great trading towns sided with the Parliament. The first action, the Battle of Edgehill, gave the king a slight advantage; but nothing very decisive happened till the Battle of Marston Moor, in 1644, when Cromwell routed the royalists. The loss of the Battle of Naseby, the year following, completed the ruin of the king's cause. Charles at length gave himself up to the Scottish army at Newark, in 1646, and by them he was handed over to the English Parliament. His death was at length demanded by the army, he was brought to trial, condemned and beheaded, in 1649. Then followed the period of the Commonwealth, under Cromwell. See COMMONWEALTH OF ENGLAND; CROMWELL, OLIVER.

CHARLES II (1630–1685), second of the Stuart kings of Great Britain and Ireland, son of Charles I and Henrietta Maria of France. After his father's defeat in the

Civil War Charles left England for France, and on his father's death he took the title of king of England, though not the throne. In 1651 he accepted an invitation from the Scots, who had proclaimed him their king, and passing over to Scotland, was crowned at Scone. Cromwell's approach made him take refuge among the English royalists, who, having gathered an army, encountered Cromwell at Worcester and were defeated. Charles escaped to France. On the death of Cromwell, the Restoration, effected without a struggle by General Monk, set Charles on the throne, and his entry into the capital (May 29, 1660) was greeted with universal acclamations. His Parliament soon allowed to him all the prerogatives which an earlier Parliament had fought to prevent Charles I from assuming, and he resorted to various illegal measures for obtaining money to support his extravagant court. Charles and the court by which he was surrounded displayed the most disgraceful licentiousness.

CHARLES VI (1368–1422), king of France, son of Charles V, whom he succeeded in 1380. His four uncles, who ruled during his minority, were in constant conflict, and the result was that when Charles took the power in his own hands he found the country in a most disturbed condition. For several years he ruled wisely, but he became insane in 1392, and his great vassals at once recommenced their conflicts. Henry V of England, taking advantage of the disturbed condition, invaded the country and won important victories, by means of which he compelled Charles VI to acknowledge him as his successor on the throne of France.

CHARLES VII (1403–1461), king of France, son of Charles VI, whom he succeeded in 1422. The crown of France at his accession was claimed by the English for their king, Henry VI, in accordance with a treaty wrung from Charles VI (which see), and the English had possessed themselves of the greater part of France. Charles seemed utterly incapable of asserting his rights, and it was not until the appearance of Joan of Arc (see JOAN OF ARC) in the French army that things were favorable for the French. In 1429 Charles was crowned king, and gradually the English were driven from France. Charles was a weak ruler, but the country was prosperous during his reign.

CHARLES IX (1550–1574), king of France, son of Henry II. He came to the throne on the death of his brother, Francis II, in 1560. Even after he was declared of age, his mother, Catharine de' Medici, who had been regent during his minority, held the chief power, and his rule was from the beginning much disturbed by the conflict between the Catholics and Protestants. These conflicts terminated in the massacre of Saint Bartholomew's Day (1572), to which Charles, through the influence of his mother, had been obliged to give his consent. His remorse over this massacre was extreme. See BARTHOLEMEW'S DAY, SAINT; HUGUENOTS.

CHARLES X (1759–1836), king of France, grandson of Louis XV, and last of the Bourbon line of kings. When the Revolution broke out in 1789, he left France and remained in exile until the restoration of the Bourbons. During the reign of his brother, Louis XVIII, he opposed all liberal measures, and after his own accession in 1824 he adopted the most reactionary policy. Public dissatisfaction was so great that in July, 1830, he was forced to abdicate. This he did in favor of his grandson, the duke of Bordeaux, but Louis Philippe had already been chosen king, and Charles was forced to flee from France.

CHARLES V (1500–1558), Holy Roman emperor, and, as Charles I, king of Spain, the grandson of Ferdinand and Isabella of Spain and of the Emperor Maximilian. He became

EMPIRE OF CHARLES V

possessed, on the death of his father, archduke of Austria, in 1506, of the Netherlands; became king of Spain on the death of Ferdinand in 1516, and three years later, when Maximilian died, was chosen as emperor over Francis I of France and Henry VIII of England. A contest with France immediately ensued, in which Charles was

completely successful; he captured Francis at Pavia and forced from him a humiliating treaty. In 1527 Rome was captured by the imperial army, and the Pope was taken prisoner, but Charles pretended to have been ignorant of the plans for this move.

Had Charles been able, at the beginning of his reign, to have turned his attention to religious matters in Germany, he might have prevented the growth of Protestantism. When, however, he did take up the question, he found that the Protestants were so strong that he was obliged to grant them concessions. A war with the Turks, a conflict with pirates and a struggle with France took his attention until 1544, when he again turned his attention to religious matters. Open war with the Protestants ensued, in which Charles was at first successful, but later defeats obliged him in 1552 to grant religious freedom to German Protestants. In 1555 he abdicated, giving Spain, with the Netherlands, to his son Philip, while his brother Ferdinand succeeded him as emperor.

CHARLES VI (1685–1740), Holy Roman emperor. When Charles II of Spain died childless, Charles claimed the throne as a rival to Philip of Anjou, who had been chosen by Charles II as his successor. The result was the War of the Spanish Succession (see SUCCESSION WARS), in which Charles had the aid of Great Britain and Holland. On the death of his brother, however, he became emperor, and England and Holland refused to aid him further in his fight for the Spanish throne. A war with the Turks and a war with Spain, in which he engaged, both terminated successfully. The latter years of this reign were spent largely in an attempt to secure the consent of the European powers to a pragmatic sanction settling the succession on his daughter, Maria Theresa (which see).

CHARLES XII (1682–1718), king of Sweden. On the death of his father, Charles XI, in 1697, he was declared of age by the estates. To his jealous neighbors this seemed a favorable time to humble the pride of Sweden, and Frederick IV of Denmark, Augustus of Poland and Peter the Great of Russia concluded an alliance which resulted in war against Sweden. With the aid of an English and Dutch squadron the Danes were soon made to sign peace, but Augustus and the czar were still in the field. Charles won several victories which, considering his youth and inferior forces, were remarkable, but at length he was completely defeated at Pultowa (1709).

He fled with a small guard and found refuge at Bender, in Turkish territory. Here he managed to persuade the Porte to declare war against Russia; but peace was soon procured, the interests of Charles were neglected, and he was forced by the Turkish government to leave. Arriving in his own country in 1714, he set about the measures necessary to defend his kingdom against the Danes and Prussians, and the fortunes of Sweden were beginning to assume a favorable aspect when he was slain by a cannon ball as he was besieging Frederikshald.

CHARLES XIV JOHN (1764–1844), king of Sweden and Norway, originally JEAN BAPTISTE JULES BERNADOTTE, a French general, the son of a lawyer of Pau. He enlisted at seventeen, received successive promotions and became in 1794 general of division. He distinguished himself greatly in the campaign in Germany and on the Rhine. In 1799 he became for a short time Minister of War, and on the establishment of the Empire he was raised to the dignity of Marshal of France, with the title of Prince of Pontecorvo. On the death of the heir apparent to the Swedish crown the Prince of Pontecorvo was chosen as Crown Prince, went to Sweden, abjured Catholicism and took the title of Prince Charles John. In the maintenance of the interests of Sweden a serious rupture occurred between him and Bonaparte, followed by his accession in 1812 to the coalition of sovereigns against Napoleon. At the Battle of Leipzig he contributed effectually to the victory of the allies. At the close of the war strenuous attempts were made by the emperor of Austria and other sovereigns to restore the family of Gustavus IV to the throne; but Bernadotte, retaining his position as Crown Prince, became king of Sweden on the death of Charles XIII in 1818, under the title of Charles XIV.

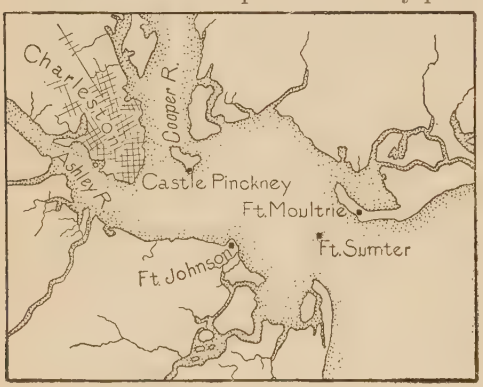
CHARLES EDWARD, the young pretender. See STUART, CHARLES EDWARD.

CHARLES MARTEL, *sharl mar tel'* (about 688–741), a Frankish leader who won undying fame by defeating the Arabs on the plains of Tours, in the year 732. By this battle the Mohammedan advance into Europe was checked and Christian civilization was saved. *Martel,* meaning *the hammer,* was a title of honor given Charles because of this victory. He was a son of Pippin Héristal,

and under the last of the Merovingian kings ruled with kingly authority, though his office was that of mayor of the palace.

CHARLES THE BOLD, (1433–1477), duke of Burgundy, the last of the great French vassals who succeeded in opposing the power of the king. He was the greatest lord in the kingdom, ruling, besides Burgundy, Flanders and a large part of the Netherlands, and for years he successfully defied Louis XI, with whom he was constantly at war. See BURGUNDY.

CHARLESTON, S. C., one of the oldest cities in the United States, founded in 1670 as Charles Town. The city is the county seat of Charleston County, and has been the capital of the state since 1790. The location of the city assures splendid harbor facilities; it is at the junction of the Cooper and Ashley rivers, where they enter Charleston Harbor at a point seven miles from the sea. It is the most important military point



CHARLESTON HARBOR IN 1861

between Hampton Roads, Va., and the Rio Grande River, and it has the only navy yard south of Norfolk.

If Cuba did not lie across the 80th parallel of latitude, Charleston would literally be what it claims to be—the "plumb line route to Panama"—for it is directly north of Colon. Its southern position gives it the distinction of being the great coal-shipping port between the South Atlantic states and South American ports, and it also ships vast quantities of fuel oil. The city has a large wholesale trade and is a very important manufacturing center. There are fertilizer works, lumber interests, textile mills, foundries, and many smaller enterprises, and over 1,300 retail stores.

In this city one sees public buildings of the most modern design, and many dating from the colonial period. The Charleston Orphan House dates from 1794; Hibernian Hall, 1799; old post office, 1760; old powder magazine, 1705; South Carolina Hall, 1804. The Charleston Library is a fine building, erected in 1915; the library was organized in 1743, and is the third oldest in America. The custom house cost $3,400,000; the navy yard has been developed at an expense of $5,000,000. More than ordinary interest centers about the historic forts, Moultrie and Sumter (see FORT MOULTRIE; FORT SUMTER). The city has numerous parks, the largest, Hampton Park, containing 318 acres. In the residence district much distinctly colonial architecture gives the city a charming appearance.

Charleston has suffered from several calamities. In 1861 a great fire destroyed a part of the city, and during the Civil War the town experienced many of the horrors of that conflict. In 1886 a severe earthquake caused great loss, and in 1893 and 1911 tropical storms did much damage. During recent years the advance of the city has been marked; it has become the most rapidly-growing seaport between Baltimore and New Orleans, and its ocean trade has greatly increased. Population, 1910, 58,883; in 1917, 61,041 (Federal estimate).

CHARLESTON, W. VA., the capital of the state and the county seat of Kanawha Co., 130 miles southwest of Wheeling, at the confluence of the Kanawha and Elk rivers, and on the Chesapeake & Ohio, the Ohio Central and other railroads. The principal buildings are the capitol, a customhouse (built in 1914), a courthouse, an opera house and a hospital. The city has a fine monument to "Stonewall" Jackson. There are regular lines of steamboats on the river, and considerable shipments of coal, salt and lumber are made. There is a large supply of natural gas in the vicinity. The industrial establishments are shipyards, railroad shops and manufactures of boilers, engines, furniture, brick, lumber, woolens and other articles. Charleston grew up around a fort which was built in 1786. It was incorporated as a town in 1794 and as a city in 1870. It has been the capital of the state since 1870, except during the decade from 1875 to 1885. Population, 1910, 22,996; in 1917, 31,060 (Federal estimate).

CHARLOTTE, *shahr'lot*, N. C., founded in 1750 and incorporated in 1768, is the county

seat of Mecklenburg County, 125 miles southwest of Raleigh, on Sugar Creek and on the Seaboard Air line and two branches of the Southern Railroad. The city is in a coal-mining region, and it contains extensive manufactures of cotton, iron, mill supplies and clothing. Within 100 miles of the city are over 300 cotton mills, so the town is an important industrial center. A branch mint of the United States government has been here since 1838. There are two colleges for women, a military institute, a Carnegie Library and a library for negroes. Population, 1910, 34,014; in 1917, 40,759 (Federal estimate).

CHARLOTTENBURG, *shahr lot'ten boork*, GERMANY, a town of Prussia, on the Spree, about three miles from Berlin, of which it is a residential suburb. It was named from the castle erected for Queen Charlotte by Frederick I, in 1699. This building is one of historical interest, and in the garden is the royal tomb in which are the remains of Frederick William III, Queen Louisa, Emperor William I and Empress Augusta. The famous royal porcelain factory, established in 1761, is located here. The suburb is an important educational center and contains among other institutions a technical academy, a royal institute of glass painting, an artillery an engineering school and a gymnasium. The industries include the manufacture of machines, glass, pottery, paper, leather and chemicals. Population, 1910, 305,181.

CHARLOTTETOWN, *shahr'lot town*, the capital of Prince Edward Island, situated on Hillsborough Bay on the southern coast and on an excellent harbor. The important buildings are the government buildings, Dominion buildings, courthouse, cathedral public library, city hall and Y. M. C. A. building. The public institutions include several hospitals, an asylum for the insane, a normal school, Prince of Wales College and Saint Dunstan's College. The leading industries include an iron foundry, railroad shops, carriage and wagon factories and woolen mills. The fisheries are also important. A considerable trade is carried on and steamer connection with the principal ports of Canada is maintained. Prince Edward Island Railway extends east and west, connecting the principal points on the islands. Charlottetown was settled by the French in 1768, and was first named Port La Joie. Population, 1911, 11,203.

CHARON, *ka'ron*, in Greek mythology, the son of Erebus and Night. It was his office to ferry the dead in his boat over the rivers of the infernal regions. He was represented as an old man of gloomy aspect, with matted beard and tattered garments.

CHART, a map or drawing which presents accurately and in graphic form certain facts as to topography, climate or other conditions. A topographical chart, used extensively by surveyors, shows the exact details of land surface to be surveyed. The mariner's chart, invaluable to navigators, gives similar information about sea coasts and harbors. Everyone is familiar with the charts or maps issued by the Weather Bureau (which see), on which are portrayed the temperature, rainfall, direction of winds and all the other climatic facts of a certain locality. Charts are also made showing the position of stars and other heavenly bodies. These are called celestial charts. Educational charts are published in great variety, dealing with phases of physiology, language, agriculture, history, and the like.

CHARTER, a written instrument which certifies to a grant, contract or other agreement from a higher power to an individual, a company or a state. By charter the early governing powers in America were assigned, as to the Plymouth Company, in the north, and the London Company, in the south. Charters are granted by states to colleges and universities, conferring upon them the right to grant degrees to graduates; to banks, allowing them to conduct business under official supervision; to local lodges and societies, by authority of the highest bodies in the organizations; to railroad companies, from state authorities, authorizing them to organize, sell stock, build their roads and operate them.

CHARTER OAK, a tree that formerly stood in Hartford, Conn., associated by tradition with an interesting episode in Connecticut history. In 1687 Sir Edmond Andros, who had been appointed governor-general of New England, went to Hartford and demanded the delivery of the charter. The colonists appeared to submit, but at the time when the ceremony was to be carried out the lights in the council chamber were extinguished and the document was carried to a hiding place in the hollow of a tree. It remained there for two years, until the deposition of Andros. Early reports of this

episode referred to the tree as an elm, and some declared that the instrument was hidden in the home of a prominent colonist; but about 1789 the belief became general that this oak had concealed the famous charter, and the tree was held in the greatest reverence until it was blown down in August, 1856. Since then a monument in honor of the tree has been erected on the place where it stood.

CHARTISM, a name given to a movement in the interests of radical reform, which was at its height in England between 1838 and 1848. The Reform Bill of 1832, while it had mended matters somewhat, had still not silenced the discontent among the laboring classes, and by 1838 matters had come to such a point that a committee of six members of Parliament and six workingmen drew up a formal demand, known as the People's Charter. The reforms demanded were six in number: (1) universal suffrage; (2) equal electoral districts; (3) vote by ballot; (4) annual Parliaments; (5) no property qualification for members of Parliament; (6) salaries for members of Parliament. Despite the fact that the agitation for these measures in some places grew violent, that monster petitions were presented to Parliament and meetings held throughout the country for years, nothing definite was accomplished, and after 1848 the movement gradually died out, as reforms beneficial to workingmen were introduced.

CHARYBDIS, *ka rib'dis*. See SCYLLA.

CHASE, SALMON PORTLAND (1808–1873), an American statesman and jurist, born in New Hampshire. He was graduated at Dartmouth College, taught school for a time, but later studied law, settled at Cincinnati and acquired a large practice there. He early showed himself an opponent of slavery, and was active in the founding of the Free-Soil party (which see). From 1849 to 1855 he was United States Senator from Ohio, and vigorously opposed the extension of slavery into the new territories, being the leading opponent of the Kansas-Nebraska Bill. In 1855 he became governor of Ohio and he was reëlected in 1857. In 1860 he was an unsuccessful candidate for the Presidency and became Secretary of the Treasury in Lincoln's Cabinet. In this post he was signally successful in providing funds for carrying on the Civil War, but he showed some opposition to Lincoln's war policy, and resigned in 1864. In the same year he was appointed Chief Justice of the Supreme Court, and in that capacity presided over the impeachment trial of President Johnson, winning high praise for his dignity and fairness.

SALMON P. CHASE

CHAT, a popular name of a number of different small, lively birds of the warbler family. They move about incessantly and rapidly in the pursuit of the insects on which they live. In the United States the so-called yellow-breasted chat is a larger bird, olive-green above and white below, with a yellow breast. Its song is a mixture of various songs, usually uttered only during the mating season, when the males carry on the most extraordinary performances in the air.

CHATHAM, EARL OF. See PITT, WILLIAM.

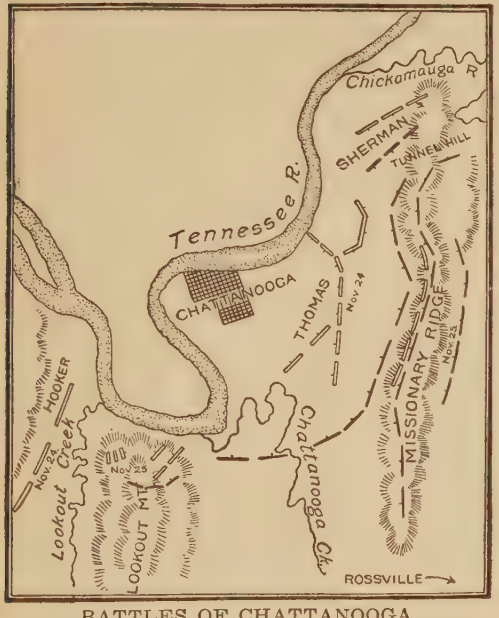
CHATHAM, NEW BRUNSWICK, in Northumberland County, on the Intercolonial Railway and the Miramichi River, about twenty-five miles from its mouth. It has an excellent harbor, which will admit ocean-going steamers. The town owns its water works and electric light plants. The chief industries are the manufacture of lumber, which is largely shipped to British markets, and the manufacture of wood pulp. There are also wood working factories and two foundries. Chatham is the center of an important fishing industry and is noted for its salmon and smelt fisheries; the lobster fishing at the mouth of the river is controlled from this town. There is a Roman Catholic cathedral and convent, a hospital and the exposition buildings for the northern part of the province. Population, 1916, 6,100.

CHATHAM, ONT., the county town of Kent County, founded in 1812, forty-eight miles east of Detroit, on the Thames River. It has the Grand Trunk, the Canadian Pacific, the Wabash and the Michigan Central railroads, and there is also river traffic into Lake Saint Clair. The manufactures include wagons, carriages, automobiles, boilers, concrete products, textiles, sugar and shoes. There are two hospitals and a library. The heating of the city's homes is largely by natural gas, which is piped from the Tilbury

field, fifteen miles distant. Population, 1911, 10,463; in 1916, 12,870.

CHATTAHOOCHEE, *chat a hoo'che,* a river rising in the Appalachian Mountains in Georgia, and forming for a considerable distance the boundary between Georgia and Alabama. In its lower course, after the junction of the Flint River, it is named the Appalachicola, and it is navigable to Columbus, Ga., for steamboats. The length of this river is 500 miles. The stream is described in Sidney Lanier's *Song of the Chattahoochee.*

CHATTANOOGA, Battles of, three simultaneous battles in the Civil War, which together constitute one of the most important engagements in the struggle. They occurred near Chattanooga, Tenn., November 23–25, 1863. The Federal army of 60,000 was under the supreme command of General Grant and faced a Confederate army of about 40,000, under General Braxton Bragg. The latter had defeated Rosecrans at Chickamauga and had taken up a position before



BATTLES OF CHATTANOOGA

Chattanooga, extending from Lookout Mountain along Missionary Ridge for a distance of about twelve miles. To Sherman, Grant assigned the task of attacking the extreme right of the Confederate line and advancing along Missionary Ridge toward the center of their position. General Thomas was to attack the enemy in the center and attempt to dislodge them. General Hooker was to attack the left of their position and drive them from Lookout Mountain.

Sherman was at first successful, but was stopped by a strongly fortified gap in the mountain ridge. Thomas gained slight successes during the first day's battle, while Hooker, in the famous "Battle above the Clouds," completely routed the enemy. On the following morning Thomas's troops, ordered to make a general assault on the enemy's works at the foot of Missionary Ridge, not only accomplished this after a stubborn contest, but pressed forward without orders, under the leadership of regimental officers, climbed the hill in the face of almost irresistible fire and drove the Confederates in confusion from the summit, ending the battle.

CHATTANOOGA, *chat a noo'gah,* Tenn., the third city in size in the state, the county seat of Hamilton County, in the southeast corner of the state, 150 miles southeast of Nashville, on the Tennessee River and on the Southern, the Nashville, Chattanooga & Saint Louis, the Queen & Crescent, the Central of Georgia, the Western & Atlantic, the Tennessee, Alabama & Georgia and the Alabama Great Southern railroads. For eight months of the year the river is navigable to this city.

There is great diversity of manufactures, for over 300 factories make more than 1,200 different articles; principal among these enterprises are steel mills, blast furnaces and textile mills. There are eleven banks, one of them a Morris Plan Bank. There are numerous fine buildings in the city which cost half a million dollars each. The University of Chattanooga offers higher education, and there are three preparatory schools, three business colleges, a Carnegie Library and six hospitals. The commission form of government was adopted in 1911.

Chattanooga was settled in 1836, and was first called "The Landing," later changed to Ross' Landing in honor of John Ross, a Cherokee chief. In 1839 it was incorporated under the name of Chattanooga. During the Civil War the city was a strategic point of great importance and several important battles were fought here, the most important being the Battle of Chickamauga, the site of which is now occupied by the Chickamauga-Chattanooga National Park (see Chattanooga, Battles of).

The city is situated in the bottom of a great amphitheater, with Lookout Mountain, Sig-

nal Mountain, Missionary Ridge and other heights of less note forming the rim. The scenery is delightful. Population, 1910, 44,604; in 1917, 61,575 (Federal estimate).

CHAT'TEL, a term in law nearly synonymous with *personal property* (see PERSONAL PROPERTY). Technically, it includes that part of personal property which can be physically delivered and possessed.

CHATTEL MORTGAGE. See MORTGAGE.

CHAT'TERTON, THOMAS (1752–1770), a boy poet, one of the greatest prodigies in the history of English literature. He pretended to have gained possession of several old manuscripts, and the forgeries which he produced deceived some of the most eminent men of the day, among them Horace Walpole. These so-called "Rowley Poems," some of which possess rare beauty of imagination, are his chief claim to fame. The most remarkable are *The Tragedy of Godwin, The Tournament, The Parliament of Sprites* and *The Tragedy of Aella.* Chatterton's poems were favorites of Coleridge, Keats, Rossetti and William Morris. The young poet committed suicide in his eighteen year.

CHAUCER, *chaw'sur*, GEOFFREY (1340?–1400), an English poet, known as the "Father of English Poetry." He was by far the greatest verse writer of the fourteenth century, and modern critics give him a place in English literature second only to that of Shakespeare and Milton. Little is known of Chaucer's boyhood or of his education. It is certain, however, that during the English invasion of France in 1359 and 1360 he was imprisoned, was finally ransomed by the king and was made a squire in the king's service. Various missions on the continent were entrusted to him, in 1374 he was made comptroller of customs for London and in 1386 he became a member of Parliament. He was, especially during the latter part of his life, very poor, and his poverty was relieved by Henry IV only a year before Chaucer's death. His connection with court matters and with business matters and his lasting place in literature show that he must have been a man of the greatest versatility.

GEOFFREY CHAUCER

In the early part of his literary career Chaucer contented himself with translations from the French. He then came under the influence of Italian literature, and this influence shows plainly in such productions as *Troylus and Cryseyde, The Legende of Good Women* and *The Parlement of Foules.* In his third and greatest period he was thoroughly English in his theme and in his treatment of it. His masterpiece, The *Canterbury Tales* (which see), was, indeed, in its form modeled somewhat after Boccaccio's *Decameron,* in that it comprised the tales of a number of persons. Chaucer's scene, however, is English, his personages are pilgrims who are journing from the Tabard Inn to the tomb of Thomas à Becket, and the poem gives a marvelous picture of the life of the day in England.

CHAUDIERE, *sho dyair'*, a river of Canada, province of Quebec, which rises on the borders of Maine, near the sources of the Kennebec, and flows into the Saint Lawrence about six miles above Quebec. It is 120 miles long. The banks are steep and rocky. Three miles above the river's junction with the Saint Lawrence are Chaudière Falls, about 120 feet high.

CHAUFFEUR, *sho fer'*, a French word which means, literally, a *stoker.* It has been given a new but somewhat related meaning, and now refers to a person who runs and cares for an automobile, particularly one who serves as a salaried driver. Historically chauffeurs were bands of brigands who pillaged Europe about the year 1793.

CHAUTAUQUA, *sha tawk'wa,* **INSTITUTION**, an organization for the promotion of popular education by means of summer schools and home study. This system is the outgrowth of a Sunday School assembly organized in 1874 at Chautauqua Lake, New York, by the Rev. (later Bishop) John H. Vincent and Lewis Miller. Though the instruction at first was along religious lines alone, the work has developed until now there are fifteen different departments.

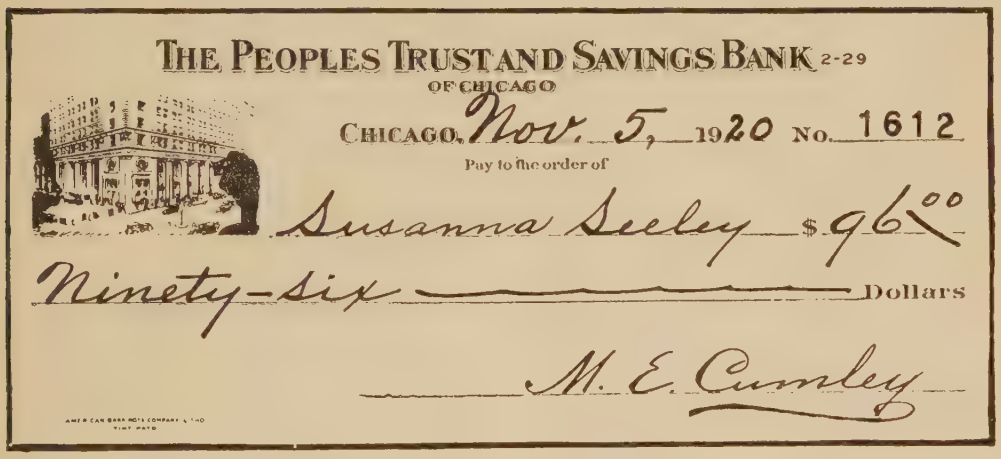
Summer Schools. The system of summer schools was completely worked out under the inspiration of the late Dr. Harper of the University of Chicago, who devoted his summers to the work from 1883 to 1893. There are fifteen courses given during the months of July and August at Chautauqua, embracing instruction in the languages, European and ancient literature, history,

pedagogy, science, mathematics, religious training, music, domestic science, arts and crafts, expression and physical education. Professors from leading universities and colleges give instruction, and about 3,000 students attend the classes in normal years. There are, besides, lectures, dramatic and musical entertainments and similar forms of recreation, for which no additional fee is charged.

Literary and Scientific Circle. This feature of the Chautauqua system is the home reading course. It was organized in 1878. Each course consists of four years of reading (American, English, European and Classical), the work of each year being a complete unit. The courses include history, art, travel, science and literature. Each member of the Circle reads the same books, which are prepared especially for the Chautauqua Institution. A weekly periodical, *The Independent,* contains supplementary readings, comment on current events and other matter, and there are also a monthly bulletin, *The Round Table,* and a membership book containing helps for home study. Anyone completing a four years' reading course is awarded a diploma. Correspondence work, formerly a feature of the system, has been discontinued. Since 1878 over 300,000 persons have joined the Circle, and 60,000 have completed at least one course. Branches have been organized in Japan and South Africa, and in Canada; in England a home reading system modeled on the Chautauqua plan has been formed.

Local Chautauqua. Summer assemblies are now held in different parts of the United States, and are especially popular in rural neighborhoods. Sessions cover several days and are devoted to lectures, concerts and other forms of entertainment.

CHECK, a written order by one person or company upon a bank to pay a certain sum of money to another person. There are therefore three parties to every transaction of this kind: the *drawer* of the check, who must have on deposit at the bank sufficient funds to meet the amount of the check; the *bank,* or the *drawee,* and the *payee,* the one named in the check to receive the money.


THE PEOPLES TRUST AND SAVINGS BANK 2-29
OF CHICAGO
CHICAGO, Nov. 5, 1920 No. 1612
Pay to the order of
Susanna Seeley $96.00
Ninety-six Dollars
M. E. Cumley

COMMON FORM OF CHECK

It is estimated that about ninety-five per cent of the balances resulting from commerce are paid by check. The regular use of them for all payments, except of small amount, makes the transfer of funds through banks a mere matter of bookkeeping and tends greatly to economize the use of the precious metals as a currency. Paid checks are returned at intervals to the drawer, and thus serve as receipts in the transactions which they represent.

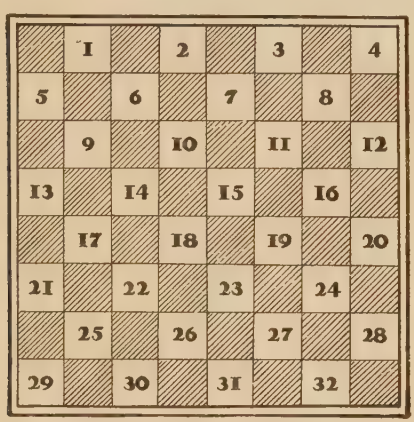
If a check is made payable *to bearer,* any person can cash it; this is an unsafe form of check. If it is payable to *John Jones,* nobody except John Jones can cash it; this is an inconvenient form. If it is payable to *John Jones, or order,* or *to the order of John Jones,* that person can cash it, or he can transfer it to another person by *endorsement.* This consists of a formal order, written on the back of the check, to

pay to another person the amount named in form as follows:

Pay to order of William Smith.
JOHN JONES.

Checks were first used in 1781, in Venice. See DRAFT.

CHECK'ERS, a very old game, played with checkers or "men" on a board of sixty-four black and white squares. The figure represents the board, numbered in the usual method for registering games. Two players, each having a set of twelve men—one set white, the other black (or round and square, or distinguished in any other way)—sit opposite each other, having their men arranged on squares 1 to 12 and 21 to 32, respectively. The men can be placed either on the black or white squares, but all must



CHECKER BOARD

be placed on one color only. Whichever color is used, however, the single corners 4 and 29 must be at the player's left hand. The object of the game is to clear off the opponent's men altogether from the board, or so to shut them up that they cannot be moved. Generally the black men play first, and as the men are changed each game, the first move becomes alternate. Each player alternately moves one man at a time diagonally forward, always keeping on the same colored squares. When an enemy's man stands in the way, no move can be made unless there be a vacant square immediately beyond, into which the man can be lifted, in which case the man leaped over is "taken," and removed from the board; and so on, till the game is lost and won, or drawn. When a man on either side has succeeded in making his way to the opposite side of the board, he becomes *crowned.* This is done by putting another man on the top of him, and he can then move in any diagonal direction, but always only one square at a time, except in the taking of the opponent's men.

The game was played in Europe in the sixteenth century, and in 1668 a treatise on the game was published in Paris. The Greeks and Romans had a similar game, and the Egyptians are represented on monuments as engaged in some such amusement.

CHEESE, an important dairy product made principally from the "curds" of milk. There are hard and soft varieties, all of which find a ready market in all civilized countries. Of the soft cheeses, the so-called *cottage* (or *Dutch*) cheese is the variety most easily made. It is prepared from curdled milk which has been heated gently for the purpose of toughening the curds. After the whey is drained off the curd is salted, and sometimes cream is added. *Roquefort* cheese is a soft cheese in which the ripening process is carried to a point at which a blue mold forms through the mixture. Other soft varieties include *Neuchâtel, Camembert* and *Limburger.*

The principal hard cheeses are the *Cheddar* (used extensively in the United States and Canada), the English *Cheshire* and *Stilton,* the Dutch *Edam* and *Gouda,* the *Schweitzer* (Swiss) and the Italian *Parmesan* and *Gorgonzola.* The process of making Cheddar cheese is about as follows: Fresh milk is ripened, rennet extract added and stirred in to curdle it, and the milk is held for ten or fifteen minutes at from 82° to 86° F. The whey is afterward separated from the curd, and the latter is cut up, salted, and pressed into desired forms. The molds are then pressed to eliminate any surplus whey, and the product is ripened in a cool place. Cheese made from milk with the butter fat left in is called *full-cream;* when only part of the fat is left the product is called *half-skim,* and when all fat is removed the cheese is called *full-skim.* The latter is hard and leathery, and in some sections its manufacture is illegal.

Cheese is a highly nutritious food, and has a fuel value almost three times that of an equal amount of eggs. It cannot be digested by everybody, but this is true of many other foods. Generally speaking, it is easily digested if properly masticated and eaten in moderate quantities.

Both the United States and Canada are

important cheese-producing countries, and in normal years the latter country exports almost 200,000,000 pounds. Ontario is the chief province in production; in the United States Wisconsin and New York lead.

CHEESE INSECTS, insects which affect cheese. There are two particularly injurious species. The *cheese hopper,* or *cheese skipper,* is a small black fly which deposits its eggs deep in the cracks of cheese, ham and beef. The maggot has two horny, claw-shaped mandibles, with which it digs into the cheese and moves about, as it has no legs. By bringing the two ends of its body together and separating them by a jerk, it can throw itself twenty or thirty times its own length. The other cheese pest is the *cheesemite,* a minute creature which leaves upon the cheese a brown, powdery mass of skins. Scrupulous cleanliness in places where cheese is kept is the best defense against these pests.

CHEE'TAH, *or* **CHEE'TA,** an animal of the cat family, found principally in Africa and India, and most commonly known as the *hunting leopard.* It derives this name from the fact that it can be trained to hunt antelopes and other like game. The cheetah has a little longer body in proportion to its size than the other cats, and its legs are slender. It can maintain a greater speed for a short distance than can any other mammal.

CHEMISTRY, *kem'is try;* the science which treats of the different kinds of matter in the universe, their properties, laws of combination and relations to one another.

Beginnings of Chemistry. There is another word, the name of what used to be considered a science, which is closely related to the word *chemistry;* it is *alchemy.* One word, in fact, grew out of the other, just as the science of chemistry grew out of alchemy. Just what the name came from has been discussed for very many years; it seems most probable that it was derived from *Chemia,* an old name for Egypt, and that it thus means merely the Egyptian art. This is reasonable enough, for alchemy was first practiced by the Egyptians.

There was another name given to alchemy, a name which had a most unfavorable meaning—the Black Art. The Egyptian priests, with whom the study began, were so mysterious about their researches that people in general got the idea that they must be dealing in magic. And when we remember what it was that the alchemists were trying to do, we do not wonder that they kept it secret. For they were trying to discover a way to change all metals to gold. They never doubted that such a thing could be done—the only trouble was to find the substance with which the base metals had to be treated. They had a name for this wonderful substance, though they could not discover its nature; it was called the Philosopher's Stone.

Sometimes the alchemists wrote out accounts of what they did, for their own use in the future or for the use of other alchemists, but since it was necessary that no outsider should find out about the great secrets which they felt they were always just on the verge of discovering, they set down their records in the most mysterious, ambiguous way possible. This, of course, added to the idea that it was a Black, or Secret, Art.

The Arabs were always interested in sciences, and when, in the seventh century, they invaded Egypt, they took up at once the science which they found there. In the next century an Arab alchemist made some real discoveries. He found a substance that would dissolve gold and he worked out several very important combinations. He also advanced the theory that there were certain elements from which all other substances are made, but he believed that there were only two of these primary substances.

During the Middle Ages alchemy flourished, especially in Spain, where the Mohammedans from Arabia had settled and founded schools. Students from these schools returned to their own countries and taught the science there, and sometimes kings kept alchemists in their service; for why should not a science be popular which had for its object the making of much gold?

But through working towards this end and constantly experimenting, alchemists gained a fund of knowledge about many substances in nature which was very useful. And gradually they came to see that this knowledge might be very useful for at least one purpose—the compounding of medicines. Little by little the original object came to be neglected; men learned enough about gold to

realize that it could not be made of tin or of zinc, and enough of other substances to see that they were valuable in themselves, aside from their possible use as a basis for gold.

In this way the science of chemistry began, and many substances were prepared that were later of great use to chemists. Paracelsus did a great deal for modern pharmacy and medicine in the preparation of drugs. During the seventeenth century alchemy lost its hold on students, and new theories that paved the way for modern thoughts and beliefs were proposed by such men as Boyle, Becher, Stahl and others. Their ideas, though many of them wholly wrong, set men to thinking in the right direction. Black, Priestley, Scheele and Rutherford did important work in the study of gases and made valuable discoveries and separations. Lavoisier, in the latter part of the eighteenth century, was the first to use the balance and to determine substances quantitatively. He was followed by Sir Humphry Davy, Berzelius, Dumas and many modern chemists, all of whom perfected the science as known to-day.

Branches of Chemistry. The science of chemistry is divided into various branches, the most general and important of which are these:

Organic, that division which treats of the carbon compounds. In early times it was thought that every organic compound had a vital principle, as it was called; that is, that it was formed by, or existed in, living plants and animals only. But when Wöhler in 1828 produced an organic compound, called urea, from its elements, this idea began to lose its hold on chemists, and when later other organic compounds were produced artificially, the theory of vital principle was wholly given up. Since all organic compounds contain carbon, the term *organic chemistry* is now defined as the chemistry of the carbon compounds.

Inorganic Chemistry, that division which treats of those compounds that are not united with carbon. The dividing line, however, is not very sharp; for example, carbon dioxide is usually regarded as an inorganic substance, and yet it is a carbon compound.

Some other special divisions of chemistry are:

Agricultural Chemistry, which deals with the problems of the farm and farm products.

Electro-Chemistry, which treats of the use of electricity in chemical problems.

Industrial Chemistry, which is the application of chemical ideas to manufacturing products.

Physical Chemistry, which is that part of the science dealing with physics in its relation to chemistry.

Thermo-Chemistry, which deals with heat changes taking place in chemical reactions.

Chemical Elements. Chemistry divides all substances in the world into two classes: either they are elements or they are compounds. An element is a substance which cannot be divided into two or more simpler substances; a compound is a substance made up of elements. There are in all at the present time about eighty substances which no amount of experimenting, no trying of process after process, has ever reduced to simpler forms; and these eighty we call elements. Of course it may be that some chemist of the future will succeed in breaking up some of these substances; but until this is done they will be considered elements. For a list of important elements, see subhead below, *Chemical Elements and Symbols.*

Chemical Compounds. The subject of compounds in chemistry is very interesting, for a chemical compound is a different thing from some of the substances we are used to considering as compounds. If you eat a piece of cake you can say at once, "There is sugar in this cake; there is butter, there is flour, and vanilla flavoring; there are eggs." It is *one* thing—a piece of cake; but you think of it instantly as made up of many things; that is, as a compound. But when you taste common salt you have no feeling that it is a compound; when you drink water you are not conscious of drinking *two* things; and yet both of these are compounds.

There is an experiment which is easily tried which will show us something about what a compound in chemistry is. Take a small quantity of very fine iron-filings and mix with them a small quantity of powdered sulphur. No matter how thoroughly you mix them, they are still iron and sulphur; you can tell them apart when you look at them through a microscope, and you can draw out the iron by simply holding a magnet over the mixture. But if you hold an iron spoon containing the mixture over a hot flame, the iron and the sulphur com-

CHEMISTRY

Definition and History

1. The science which treats of the different kinds of matter, their properties, laws of combination, and relations to one another.
2. As a science it is of modern origin.
3. At a very early date it existed as alchemy, the object of which was to discover the philosopher's stone. It led to modern thought and the formulation of a true system.
4. During the time of Lavoisier the names element and compound were correctly applied.

BRANCHES OF CHEMISTRY

1. Organic Chemistry.

a. That division which treats of the carbon compounds.

b. In early times it was thought that every organic compound had a vital principle, existing in living plants and animals only.

c. This theory was abandoned when organic compounds were produced artificially by Wöhler and others.

2. Inorganic Chemistry.

a. That division which treats of those compounds that are not united with carbon.

b. The dividing line not very sharp. Carbon dioxide is usually regarded as an inorganic substance, and yet is a carbon compound.

3. Agricultural Chemistry.

Deals with farm problems and farm products.

4. Electro-Chemistry.

Treats of the use of electricity in chemical problems.

5. Industrial Chemistry.

The application of chemical ideas to manufacturing products.

6. Physical Chemistry.

That part of the science dealing with physics in its relation to chemistry.

7. Thermo-Chemistry.

Deals with heat changes taking place in chemical reactions.

PRINCIPLES OF CHEMISTRY

1. Element.

An element is a substance which cannot be separated into two or more different substances molecules that contain but one kind of matter, such as arsenic, carbon. In 1906 seventy-seven elements were known.

2. Compound.

A compound is a substance composed of two or more substances, such as water. The force which holds together the elements in the form of compounds is called chemical affinity.

3. Laws of Combination.

a. Chemical combination takes place between molecules when very close together, when in solution or melted together.

b. Chemical combination always effects a change in all bodies.

c. Chemical combination takes place with different degrees of force in different bodies.

d. Chemical combination is much affected by such forces as heat, light, electricity and mechanical force.

e. All substances, elementary and compound, combine in fixed and definite proportions by weight.

f. When bodies combine in more than one proportion, their other combining proportions are simple multiples of the lowest.

g. Gases combine in fixed and definite proportions by volume as well as by weight.

h. The combining proportions of compounds are the sum of the combining proportions of their constituent elements.

GREAT CHEMISTS

Boole. Faraday. Gay-Lussac. Lavoisier. Liebig.
Sir Humphry Davy. Berzelius. Bacon. Dumas.
Pasteur. Priestley. Black. Rutherford.

bine to make something which is neither iron nor sulphur; in fact, it is not like either iron or sulphur. If you pound the new substance to a powder, you will find that you cannot separate the iron from the sulphur now even with the strongest of magnets. That is, the two have formed a new substance which is just as real and has just as distinct properties of its own as the two original substances. But there is one difference: if you know the proper chemical means to decompose the new substance, you may get back your iron and sulphur, while neither of the original elements could have been divided by any means.

Such a mixture as that of the iron and the sulphur before they were heated is called a *mechanical mixture;* such a substance as that formed by the heating is called a *chemical compound.* Now many of the things we have in commonest use which we are used to thinking of as simple as anything could well be, are such chemical compounds. Water is such a compound; salt is another.

Atoms. What can we find out about the way those compounds which do not seem like compounds are made up? Chemists tell us that all matter which exists in the world is made up, in the last analysis, of inconceivably minute particles called *atoms.* We are not to think of these atoms as anything which could be seen by the most powerful microscope which might ever be invented; they are far too small for that. And they are indivisible. Now when a certain number of atoms of one element are brought close to a certain number of atoms of another, various things may happen. The two kinds of atoms may show not the slightest interest in each other, both remaining exactly as before; one atom of one kind may seize upon one or more atoms of the other substance and unite to form a tiny particle of a new substance; or both kinds of atoms may wait until some outside force, like electricity or heat, puts them in such a condition that they can unite. It is never hard to learn names, even long names, if we first have fixed in our minds the fact or thing which the name describes; and it will not be difficult to remember that atoms which unite with each other, either unaided or with the help of some outside force, are said to have a *chemical affinity* for each other. Unless the atoms of two substances have this chemical affinity, no amount of mixing or heating or fusing will make of them anything but a mechanical mixture.

In the very simplest form of chemical compound, one atom of one substance combines with one atom of another. But often one atom of one element will seize upon two or three or even four of another; or two atoms of one may unite with three of another.

Some of the eighty or more elements of which we know are gases; some are metals, some are solids other than metals, and one is a liquid. Naturally we are better acquainted with the solids than we are with the gases, because such things as gold, iron, lead, silver, sulphur and tin we see about us every day, while chlorine, fluorine and argon must remain little more than names to us until we come to the systematic study of chemistry.

Names in Chemistry. The names that have been given to the different elements sometimes owe their origin to mythology, or to some property they possess. No one system has been used. In modern times it is the custom to give metals a name ending in *um,* as radium, potassium. In choosing names for compounds, the aim has been to express the composition as far as possible. Thus: sodium chloride, a compound of sodium and chlorine. If more than one atom of chlorine, for example, is present in a compound, it is called a bichloride or trichloride, depending on the number of chlorine atoms. To denote a combination of an element with oxygen, the name oxide is used, as calcium oxide. In general, when there are two oxides of an element, the name of the element ends in *ous* when there is less oxygen; and *ic* when there is more oxygen. Thus, ferrous oxide and ferric oxide are used to express the oxides of iron having, respectively, less and more oxygen. This termination in *ous* and *ic* also applies to other compounds of elements, such as salts and acids. A salt derived from an *ous* acid, has a name ending in *ite;* one from an *ic* acid, a name in *ate;* thus, a salt from *sulphurous* acid is called a *sulphite;* from *sulphuric* acid, a *sulphate.*

Chemical Elements and Symbols. Chemists have a way of naming chemical compounds which shows at once that they are such compounds, and shows the elements of which they are composed. Each element has what is called a *symbol* by which it is known—usually the first letter of its name; thus O stands for oxygen, H for hydrogen

Wonder Questions in Chemistry

What is the most costly substance known?

It costs more to buy radium than any thing else on the globe. A fine glass tube of radium about an inch long is worth $4,000, and a pound of this element is valued at nine million dollars.

Why is carbonic acid gas poisonous to the lungs but harmless when taken in soda water?

Our lungs need oxygen to enable us to breathe. Since animals cannot separate oxygen from carbonic acid gas when the two are united in a compound, air containing a large proportion of the latter is unfit to breathe and causes suffocation. Water charged with this gas effervesces and froths and is a pleasant and stimulating drink.

Why does fanning a flame make it burn more intensely?

By stirring up the air one supplies the flame with more oxygen, and oxygen is the essential element in conbustion, or burning. If air be excluded from a fire the flame will die out.

What is the purest form of water known?

Fresh rain water is purer than any other kind, because rain is condensed water vapor which falls from the clouds. The water vapor is taken into the air by means of evaporation, and evaporation is nature's way of distilling water. In the process impurities are eliminated.

What is the lightest substance in nature?

Hydrogen weighs less than any other substance. A pint of this gas weighs between one five-hundredth and one six-hundredth of an ounce. A pint of water weighs 11,500 times as much as an equal amount of hydrogen.

What causes the blue flame one sees in a coal fire?

Carbon, the principal element in coal, gives rise to carbon monoxide when it combines with oxygen. Carbon monoxide is a colorless gas, but it burns with a blue flame which can easily be seen among the burning coals.

Why do gases expand more readily than liquids?

In a liquid the molecules are much closer together than in a gas. The molecules of a gas are so far apart that they do not exert any attractive force upon one another. Thus the gas has no definite volume and is constantly changing.

What is the relation between a diamond, graphite and charcoal?

These three substances are forms of carbon. They appear different to the eye because of the difference in the arrangement of their molecules.

What is ozone?

Ozone is an active and concentrated form of oxygen. If three units of oxygen are condensed into two, they will become ozone. Ozone is changed into ordinary oxygen by the action of heat. The pure air of the country districts contains a larger proportion of ozone than city air.

In what respect does mercury differ from all other metals?

It is the only liquid metal known. Like water, it may be converted into vapor by boiling, and it may be solidified by applying cold. In countries far to the north the mercury in thermometer tubes sometimes freezes.

What is meant by the term noble metal?

This term is applied to metals that do not tarnish, such as gold and platinum. They resist tarnishing because they are not readily attacked by the air and its gases.

Why is aluminum a good metal for making cooking utensils?

It is light, not easily tarnished, and resists the action of animal and vegetable juices which would corrode certain other metals.

Do chemical compounds ever vary in weight?

A given chemical compound has a definite composition by weight, and always contains the same elements in the same proportions by weight. Scientists have performed countless experiments and have never found an exception to this rule.

and N for nitrogen. And when it is desired to express a chemical compound, the letters which stand for the elements of which it is composed are written together, thus NO would mean a combination of nitrogen and oxygen. But this is not enough. *Two* atoms of one element combine with one or with three of another element. This also must be shown, and for this purpose small figures, written to the right of and below the letters, are used. For instance, H_2O means that two atoms of hydrogen combine with one atom of oxygen to form some sort of a compound. In this case, the compound is water.

In the list of the elements which follows, the letter or letters after the name represent the symbol of the element:

NAME	SYMBOL	NAME	SYMBOL
Aluminium	Al	Molybdenum	Mo
Antimony	Sb	Neodymium	Nd
Argon	A	Neon	Ne
Arsenic	As	Nickel	Ni
Barium	Ba	Nitrogen	N
Beryllium	Be	Osmium	Os
Bismuth	Bi	Oxygen	O
Boron	B	Palladium	Pd
Bromine	Br	Phosphorus	P
Cadmium	Cd	Platinum	Pt
Caesium	Cs	Potassium	K
Calcium	Ca	Praseodymium	Pr
Carbon	C	Radium	Ra
Cerium	Ce	Rhodium	Rh
Chlorine	Cl	Rubidium	Rb
Chromium	Cr	Ruthenium	Ru
Cobalt	Co	Samarium	Sa
Columbium	Cb	Scandium	Sc
Copper	Cu	Selenium	Se
Dysprosium	Dy	Silicon	Si
Erbium	Er	Silver	Ag
Europium	Eu	Sodium	Na
Fluorine	F	Strontium	Sr
Gadolinium	Gd	Sulphur	S
Gallium	Ga	Tantalum	Ta
Germanium	Ge	Tellurium	Te
Gold	Au	Terbium	Tb
Helium	He	Thallium	Tl
Hydrogen	H	Thorium	Th
Indium	In	Thulium	Tm
Iodine	I	Tin	Sn
Iridium	Ir	Titanium	Ti
Iron	Fe	Tungsten	W
Krypton	Kr	Uranium	U
Lanthanum	La	Vanadium	V
Lead	Pb	Xenon	Xe
Lithium	Li	Ytterbium	Yb
Lutecium	Lu	Yttrium	Y
Magnesium	Mg	Zinc	Zn
Manganese	Mn	Zirconium	Zr
Mercury	Hg		

This is rather a formidable-looking list, but when we really approach the study of the elements we find that it is not so complicated as it seems. Many of the substances in the list are very, very rare, and enter into compounds very seldom.

Chemistry an Experimental Science. Once we have really grasped the idea of the combining of atoms and the system of the naming of chemical compounds, we have the foundation principles of chemistry; all the rest is really variations of the same theme. But these variations are endless, or so nearly so that we can make not even a beginning of discussing them here. Chemistry is emphatically an experimental science, and no exhaustive knowledge of it can be gained without the making of experiments. Unlike experiments in physics, chemical experiments cannot well be performed at home, by an inexperienced person, as the substances dealt with are in many instances dangerous.

Related Articles. Consult the following titles for additional information:

Acetic Acid
Acetylene
Acid
Affinity
Air
Albumen
Alchemy
Alcohol
Alkali
Alkaloid
Allotropy
Alloy
Alum
Alumina
Aluminum
Ammonia
Analysis
Aniline
Antidote
Atomic Theory
Atomic Weights
Base
Blue Vitriol
Borax
Brimstone
Bromides
Calcium Carbide
Carbohydrate
Carbolic Acid
Carbon
Carbonates
Carbon Disulphide
Carbonic-acid Gas
Carbon Monoxide
Carborundum
Caustic
Chloroform
Cinnabar
Citric Acid
Coal Tar
Combustion
Copperas
Corrosive Sublimate
Cream of Tartar
Creosote
Crystallization
Cyanogen
Decomposition
Dextrin
Diffusion
Distillation
Electro-chemistry
Electrolysis
Fermentation
Fulmination
Gas
Geissler's Tubes
Glauber's Salt
Glycerine
Helium
Hydrates
Hydrocarbons
Hydrochloric Acid
Hydrofluoric Acid
Hydrogen Dioxide
Iodoform
Lime
Liquid Air
Litmus
Lunar Caustic
Magnesia
Metals
Molecule
Natural Gas
Nitrate
Nitric Acid
Nitroglycerine
Oxalic Acid
Oxidation
Ozone
Phosphates
Phosphoric Acid
Picric Acid
Potash
Prussic Acid
Putrefaction
Reactions
Rust
Sal Ammoniac
Salicylic Acid
Salt
Saltpetre
Silica
Soda
Solution
Spontaneous Combustion
Stearic Acid
Stearin
Sulphates
Sulphureted Hydrogen
Sulphuric Acid
Tannin
Tartaric Acid
Water
Wood Alcohol

CHEMISTS

Bunsen, Robert W. E.
Curie, Pierre and Marie Sklodowska
Crookes, Sir William
Davy, Sir Humphry
Faraday, Michael
Gay-Lussac, Louis J.
Liebig, Justus
Pasteur, Louis
Remsen, Ira

CHEMNITZ, *kem'nits,* GERMANY, the principal manufacturing town in the state of Saxony, on the Chemnitz River, thirty-eight miles southwest of Dresden. Because of its industrial importance it has become known as "the Saxon Manchester," and during the World War it was a center of German munition manufacture. In peace times the locomotive and machinery shops employ over 20,000 men, and the textile industries employ nearly as many. Chemnitz has many fine educational institutions and public buildings. Population, 1910, 287,807; in 1918, 358,786.

CHENILLE, *she neel',* a sort of ornamental fabric, of cordlike form, made by weaving or twisting together warp threads with a transverse filling, or weft, the loose ends of which project all around in the form of a pile. Chenille carpets have a weft of chenille, the loose threads of which produce a fine velvety pile.

CHEOPS, called KHUFU by the Egyptians, the ruler of Egypt about 2500 B. C. He built the Great Pyramid, and it is said that he employed 100,000 men for twenty years in its construction. Some of the problems connected with the task have not been solved by modern builders. See PYRAMID.

CHERBOURG, *sher boor',* FRANCE, a city and fortified seaport at the mouth of the Divette River, on the English Channel, eighty-two miles west by north of Havre. Among the chief buildings are the Church of Sainte Trinité and that of Saint Clement, the Hotel de Ville, the Marine Library, a museum and a theater. The importance of Cherbourg is due to its immense defensive and naval works. These engineering works are among the most gigantic of their kind in ancient or modern times. The commercial port consists of a harbor and a basin about 1,300 feet long and 1,400 feet wide, and is connected with the sea by a channel about 2,000 feet long and 164 feet wide, lined with granite docks with parapets. The military port, which can accommodate forty vessels of war, has three basins, is entirely cut out of solid rock and has a length of about 930 yards and a breadth of 437 yards.

Cherbourg is also celebrated for its great breakwater, or *digue,* stretching across the harbor, which is protected on three sides by land, but is open to the sea on the north. It is two and one-fourth miles from the harbor. At the meeting of the two branches of the breakwater is a central fort or battery measuring 509 feet. Population, 1911, 43,731.

CHER'OKEE. This, the largest and most important of the Indian tribes east of the Mississippi, was of Iroquoian descent, but separated into two great groups. The Upper Cherokee lived in log huts along the headwaters of the Tennessee and Cumberland rivers, where they cultivated corn, beans and pumpkins in abundance. The Lower Cherokee were wanderers and existed principally by hunting. Throughout the Revolution they sided with the British, but after the establishment of the new government they acknowledged the sovereignty of the United States. The Cherokee proved a teachable race, intermarried freely with Scotch refugees and became Christianized and educated. In 1837 they organized the Cherokee nation. George Guess, or Sequoyah, invented an alphabet from which many books were printed in their language.

One of the inexcusable cruelties of history was the treatment the Cherokee received from Georgia, which wanted their lands, and by aid of the United States troops drove the Indians out of the state. After a terrible march, the Cherokee finally settled in the Indian Territory, where, under their famous chief, John Ross, they again set up their government at Tahlequah. The Civil War again brought them in conflict with both the Confederate and Union armies, and it was only with the greatest difficulty that they preserved their independence. These Indians are refined and are in appearance scarcely distinguishable from the whites, among whom they now are classed as citizens of the United States. They number about 20,000. See FIVE CIVILIZED TRIBES.

CHERRY, a tree belonging to the same family as the plum and the prune, whose small round, usually red fruit is a table delicacy. There is also a species of black cherry. The cherry blossom of early spring, a white flower with pink center, is famous in song and legend; particularly does it add to the charm of Japan, "the land of cherry blossoms."

American production is greatest in California, which raises twelve per cent of the total crop of about 4,200,000 bushels; Pennsylvania, Ohio and Michigan are next in quantities grown. The value of the yearly crop is about $7,250,000. In Southern

Canada cherries are grown, but not in large quantities.

The wood of the tree is fine grained and dark and takes a high polish. It serves a valuable purpose in the making of high-grade furniture.

CHERRY LAU'REL, the common name of an evergreen shrub, a native of Asia Minor, but now naturalized in America and common in shrubberies. It is commonly called laurel, but it must not be confounded with the sweet bay or other true species of laurel. The leaves yield an oil nearly identical with that from bitter almonds, but less dangerous to use.

CHERRY VALLEY MASSACRE, a massacre perpetrated in the village of Cherry Valley in central New York, by 700 British, Tories and Indians, December 10, 1778. The attack was made at night and without warning, and about fifty inhabitants were murdered, including women and children. This episode and that of the Wyoming Valley Massacre led to the expedition of General Sullivan through New York in the following year. See REVOLUTIONARY WAR.

CHER'UB, a word derived from the Hebrew word *to know,* and applied to one of a heavenly order of beings who are supposed to excel in knowledge. Cherubim rank next to seraphim among the angelic orders. In art they are generally depicted as heads with one, two or three pairs of wings. Among the most famous cherubim in art are those which form the clouds in the background of Raphael's *Sistine Madonna.* Perugino's *Assumption of the Virgin* and Murillo's painting of the same name also contain beautiful representations of these heavenly beings.

CHESAPEAKE, THE, a vessel famous in the history of the American navy. It was built early in the nineteenth century and in 1807, under the command of Commodore James Barron, started across the Atlantic on a training cruise. It was overtaken and halted by the *Leopard,* a British frigate, whose purpose was to demand the return of British deserters who were alleged to be among the *Chesapeake's* crew. Barron refused to accede to this demand, and his vessel was attacked. After a brief but vigorous action the *Chesapeake* was forced to surrender, and four sailors were taken aboard the British vessel. The American government immediately demanded reparation from England, but none was forthcoming. This incident, which was known as the "*Chesapeake* affair," was one of the chief events which led to the War of 1812.

During the War of 1812, on June 1, 1813, the *Chesapeake,* commanded by Captain James Lawrence, fought a battle with the British vessel *Shannon* in Massachusetts Bay. Again the *Chesapeake* was forced to surrender, its captain being mortally wounded. During his last hours he encouraged his men with the cry, "Don't give up the ship," which has since been a stirring slogan in the American navy. The *Chesapeake* was taken to Halifax and afterwards was made into a British man-of-war, but was demolished in 1820.

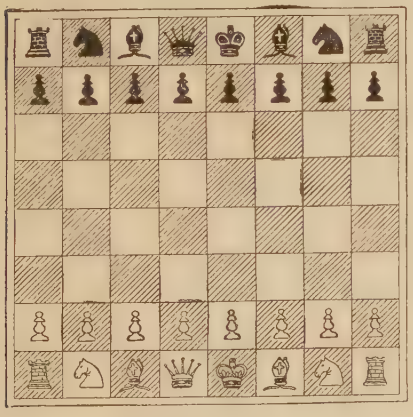
CHESAPEAKE, *ches'a peek,* **AND OHIO CANAL**, a canal extending from Georgetown, D. C., now a part of the city of Washington, to Cumberland, Md. It is 184.5 miles long, sixty feet wide and six feet deep, and it has seventy-four locks, with a total lift of 609 feet. It was completed in 1850. This canal follows the course of the Potomac River and is chiefly used in the transportation of coal.

CHESAPEAKE BAY, a very important arm of the Atlantic Ocean, entering the states of Virginia and Maryland and dividing the latter into two parts. Its length is 200 miles; its width is from ten to forty miles, and its depth is from twenty to sixty feet. The entrance between Cape Charles and Cape Henry is twelve miles wide. The coasts are irregular, and some of the largest inlets are estuaries of large rivers, such as the York, James, Potomac and Susquehanna. The bay is navigable its entire length for the largest steamers, and Norfolk and Baltimore are important ports for both inland and foreign trade. The bay is noted for its extensive oyster beds; the Chesapeake oyster fisheries are the most extensive of any in the United States, Long Island Sound ranking second. Most of the annual catch of 20,000,000 bushels yearly in the Middle Atlantic states is from this bay.

CHESS, a well-known game, of great antiquity and of Eastern origin, having probably arisen in India and thence spread through Persia and Arabia to Europe. It is probably the slowest of all games to play, and the one requiring deepest thought.

The game is played by two persons on a board, which consists of sixty-four squares,

arranged in eight rows of eight squares each, alternately black and white. Each player has sixteen men, eight of which, known as *pawns,* are of the lowest grade; the other eight, called *pieces,* are of various grades. They are, on each side, *king* and *queen,* two *bishops,* two *knights* and two *rooks,* or *castles.* The board must be placed so that each player shall have a white square at his right hand. The men are then set upon the two rows of squares next the players, the pieces on the first, the pawns on the second, row, leaving between the two sides four unoccupied rows. The king and queen occupy the central squares facing the corresponding pieces on the opposite side. The queen always occupies her own color, white queen on white square, black on black. The two bishops occupy the squares next the king and queen; the two knights the squares next the bishops; the castles, or rooks, the last, or corner, squares. The pawns fill the squares of the second, or front, row (see accompanying diagram).



CHESS BOARD
Men in Opening Position.

The men standing on the king's or queen's side of the board are named respectively king's and queen's men. Thus king's bishop or knight is the bishop or knight on the side of the king. The pawns are named from the pieces in front of which they stand; king's pawn, king's knight's pawn, queen's castle's pawn, etc. The names of the men are contracted as follows: King, K.; King's Bishop, K. B.; King's Knight, K. Kt.; King's Castle, K. C. or K. R.; Queen, Q.; Queen's Bishop, Q. B.; Queen's Knight, Q. Kt.; Queen's Castle, Q. C. or Q. R. The pawns are contracted: K. P., Q. P., K. B. P., Q. Kt. P., etc. The board is divided, inversely from the position of each player, into eight rows and eight files. Counting from White's right hand to his left, or from Black's left to his right, each file is named from the piece which occupies its first square, and counting inversely from the position of each player to that of the other, the rows are numbered from 1 to 8. At White's right-hand corner we have thus K. R. square; immediately above this K. R. 2; and so on to K. R. 8, which completes the file; the second file begins with K. Kt. square on the first row, and ends with K. Kt. 8 on the eighth. White's K. R. 8 and K. Kt. 8 are thus Black's K. R. square and K. Kt. square, and the moves of each player are described throughout from his own position, in inverse order to the moves of his opponent.

In chess a man captures by occupying the position of the captured man, which is removed from the board. The ordinary move of the *pawn* is straight forward in the same file; a P. never moves backward. The first time a pawn is moved it may be played forward one square or two; afterward only one square at a time. But in capturing an adverse piece the pawn moves diagonally to occupy the position of the captured man. When a pawn reaches the eighth row it can no longer remain a pawn, but must at once be exchanged for a piece. The player may choose any piece except the king, but the queen, the most valuable piece, is generally the piece chosen. This is called *queening a pawn,* and the player may thus have several queens on the board. The *rook,* or *castle,* moves in any direction and for any distance that is open, along either the particular row or the file on which it happens to stand. It can, of course, capture any obstructing man and occupy its place. The *bishop's* moves, like the castle's are unlimited in range and are either backward or forward, but their direction is diagonal, and any bishop must always occupy squares of the same color. The *queen* combines the moves of the castle and the bishop. She is the most powerful piece on the board and can move in any direction or to any distance in a straight line. The *king* is at once the weakest and most valuable piece on the board. In point of direction he is as free as the queen, but for distance he is limited to the adjacent squares. Standing on any central square, he

commands the eight squares around him, and no more. Besides his ordinary move the king has another by special privilege, in which the castle participates. Once in the game, if the square between king and castle are clear, if neither king nor castle has moved, if the king is not attacked by any hostile man and if no hostile man commands the square over which the king has to pass, the king may move two squares towards either king's castle or queen's castle, and the castle at the same time may move to the square over which the king has passed. This is called *castling*. The *knight*, unlike the other pieces, never moves in a straight line. His move is limited to two squares at a time, one forward or backward, and one diagonally, and he can leap over any man occupying a square intermediate to that to which he intends to go. The knight, like the king, when on a central square commands eight squares, but they are at two squares' distance, and all in an oblique direction. All captures in chess are optional.

The definite aim in chess is the reduction to surrender of the opposing king. The king in chess is supposed to be inviolable; that is, he cannot be taken, he can only be in such a position that if it were any other piece it would be taken. Notice of every direct attack upon him must be given by the adversary saying "check" and when the king is attacked all other plans must be abandoned and all other men sacrificed, if necessary, to remove him from danger, cover the attack or capture the assailant. It is also a fundamental rule of the game that the king cannot be moved into check. When the king can no longer be defended on being checked by the adversary, either by moving him out of danger, or by interposing or by capture, the game is lost, and the adversary announces this by saying "checkmate." When, by inadvertence or want of skill, the player having the superior force blocks up his opponent's king so that he cannot move without going into check, and no other man can be moved without exposing him, the player, reduced to this extremity, cannot play at all. In such a case, the one player being unable to play and the other being out of turn, the king is *stalemated* and the game is considered *drawn*, that is, concluded without advantage to either player.

CHEST, *or* **THO'RAX**, the cavity of the human body which lies between the neck and the abdomen. It is bounded by the ribs, sternum and diaphragm and that portion of the spinal column to which the ribs are attached. It is conical in shape, with the apex upward, and contains the heart, lungs, great arteries, veins and nerves, the trachea, bronchi, oesophagus and thoracic duct. The organs of the chest are subject to many diseases, some of which are frequently fatal. Those diseases most to be dreaded are diseases of the heart, and asthma, consumption, bronchitis and pneumonia.

CHESTER, ENGLAND, a river port, capital of Cheshire, situated on the right bank of the Dee, sixteen miles southeast of Liverpool. It is one of the oldest cities of England and still has many traces of early periods. There are around the city ancient walls of sandstone, which surround it for a circuit of two miles, forming beautiful promenades. The streets, which were hewn out of rock by the Romans at a depth of from four to ten feet, are a very interesting feature of the town; they are called *rows*. Among the chief buildings are the Chester Cathedral, several other fine churches and a portion of a castle founded by William the Conqueror. The River Dee is here crossed by three bridges, the most noteworthy of which is Grosvenor Bridge, a splendid stone structure 200 feet in length. The principal trade is in cheese, for which Chester for a century has been especially celebrated. Population, 1911, 39,028.

Chester Cathedral, a beautiful structure of sandstone, built in Norman Gothic style. It is cruciform, and has a tower 127 feet high. The cathedral has an especially beautiful choir, 125 feet in length, and its charm is increased by the magnificent carved wooden stalls, which are unrivaled elsewhere in England.

CHESTER, GEORGE RANDOLPH (1869–), an American writer of humorous and spirited stories of modern life. The best known of these is the *Get-Rich-Quick-Wallingford* series, which proved as popular on the stage as in book form. Chester was born in Ohio. He began his career as a reporter for the Detroit *News*, and subsequently became Sunday editor of the Cincinnati *Enquirer*. Eventually he became one of the best-known magazine writers in America. Underneath the fun and adventure in his stories one always finds real pictures of human nature. Chester's works, besides the Wallingford series, include *Cordelia Blossom, A Cash Intrigue, The Mak-*

ing of Bobby Burnit, Five Thousand an Hour and *The Enemy.*

CHESTER, Pa., the oldest town in the state, was settled in 1644 and until 1682 was called Upland. In the latter year it was given its present name, in honor of Chester, England. It is in Delaware County, fourteen miles southwest of Philadelphia, on the Baltimore & Ohio, the Pennsylvania and the Philadelphia & Reading railroads. The old city hall was built in 1724, and one of the homes of William Penn is here. There are manufactures of cotton, woolen and silk goods, locomotives, and hundreds of other articles of lesser note. The commission form of government was adopted in 1913. Population, 1910, 38,537; in 1917, 41,857 (Federal estimate).

CHESTERFIELD, Philip Dormer Stanhope, Earl of (1694–1773), an English statesman and author. His letters to his son, written to form the manners of the young man, combine wit and good sense with knowledge of society. The writer himself had such distinguished manners that his name is even now associated with good breeding. Chesterfield succeeded his father in the title in 1726, sat in the House of Lords and acquired some distinction as a speaker. In 1728 he was ambassador to Holland, in 1744 lord lieutenant of Ireland, a position which he occupied with great credit, and in 1746, secretary of state. Two years later, however, he retired from public affairs and lived as an English gentleman.

CHESTERTON, Gilbert Keith (1874–), one of the foremost English writers of his day, widely known as a poet, essayist and novelist. He studied at Saint Paul's School and at the Slade Art School, beginning his literary career by writing for various London newspapers and magazines. His unusual style and quickness of wit, and above all his extreme fondness for paradox quickly brought him into public notice, and he has found a wide circle of admirers among thoughtful readers. In 1900 he brought out two volumes of verse—*The Wild Knight* and *Greybeards at Play.* These were followed by a number of books, including critical biographies of Browning, Watts, Dickens and Shaw; several volumes of essays, represented by *Heretics* and *Orthodoxy*; and a number of stories, including the *Father Brown* series, *Manalive* and *The Flying Inn.* In 1913 his play, *Magic,* was produced.

CHESTNUT, *ches'nut,* a genus of trees allied to the beech, which had its origin in Italy. The *common,* or *Spanish,* chestnut is a stately tree, with large, handsome, dark green leaves. The fruit consists of two or more seeds, enveloped in a prickly husk. Probably a native of Asia Minor, it has long been naturalized in Europe and was perhaps introduced into Britain by the Romans. The tree grows freely in the United States and may reach the age of many centuries. Chestnuts form a staple article of food among the peasants of Spain and Italy. The timber of the tree was formerly more in use than it is now. It is inferior to that of the oak, though very similar to it in appearance, especially when old. Two American species of chestnuts have edible fruits. One is often regarded as identical with the European tree. The name of *cape chestnut* is given to a beautiful tree of the rue family, a native of the Cape of Good Hope. See Horse-chestnut.

CHESTNUT BURS AND LEAVES

CHEVIOT, *chev'i ut,* **HILLS,** a range of low mountains between England and Scotland, about thirty-five miles long, extending from the sources of the Liddel to the River Tweed. The hills are grass-covered and furnish pasturage for large flocks of sheep. Grouse are plentiful. The hills were long the scene of Border warfare and of the romance connected with it. Here occurred the conflict between Hotspur and Douglas immortalized in the most famous of English ballads, *Chevy Chase.*

CHEVRON, *shev'run,* a distinguishing mark on the sleeve of the coat to indicate non-commissioned rank in armies. It consists of bars meeting at an angle. In the United States army the lowest non-commissioned office, that of corporal, the chevron consists of two bars; a sergeant has three bars; a first sergeant, three bars and a lozenge. See Insignia.

CHEWING GUM, a plastic, insoluble substance made of chicle or spruce gum, and

intended for continued mastication. To render it pleasant to the taste it is usually sweetened with wintergreen, spearmint or other essence of agreeable flavor. The chewing-gum habit, obnoxious to the majority of people, has grown to enormous proportions in America. It was little known in England prior to the World War, but American and Canadian soldiers found it immensely useful on the march in allaying thirst, and the habit was soon widely adopted by Europeans. Before the war an American manufacturer had spent a vast sum in England to encourage gum-chewing, but without success.

Over 14,000,000 pounds of chicle (which see) are imported into the United States yearly to be made into chewing gum. It comes mostly from Yucatan and Southern Mexico. The retail value of chewing gum purchased each year is close to $200,000,000.

CHEYENNE, *shi en'*, or *she en'*, a brave and manly tribe of plains Indians of Algonquian stock. Originally they were agriculturists, living in settled villages, but when they obtained horses they became expert riders and gave up their settled habitations. It would seem that so intelligent and powerful a race might have been civilized, if decently treated, but they became the fiercest enemies of the whites, and the terrible cost of subduing them can never be estimated. At present about 1,200 are living peacefully on a reservation in Arizona, while about 2,000 more are living among the whites in Oklahoma.

CHEYENNE, *shi en'*, Wyo., founded in 1867, is the county seat of Laramie County and since 1869 has been the capital of the state. It is situated 106 miles north of Denver, Colo., on the Union Pacific, the Chicago, Burlington & Quincy, and the Colorado & Southern railroads. It is on a pleateau more than 6,000 feet above the sea. The city has 160 acres in parks, a waterworks system costing about $2,000,000, Union Pacific railroad shops, four banks, a Carnegie Library, two hospitals, and a Federal building which is one of the finest in the West. Near the city is Fort D. A. Russell, the largest fort in the interior of the United States. The city is the originator of the Frontier Days' Wild West celebration, which is held annually and attracts thousands of people. The commission form of government was adopted in 1913. Population, 1910, 11,320; in 1917, practically unchanged.

Fort Dearborn Massacre Monument

CHICAGO, Ill., the world's largest lake port and its fourth city in population, situated at the head of Lake Michigan, on its southwestern shore, and on the Chicago River. It is in Cook County, of which it is the county seat. The site of this great city, whose marvelous growth has been crowded into less than a century, is considerably east of the center of the country, for Chicago is 911 miles from New York and 2,274 miles from San Francisco. It was thus well located to become the "metropolis of the Middle West", a title that it deserves not only in respect to population, but in regard to commerce, communication, wealth and industry.

The historian of this city usually begins his story with some reference to its rapid growth, for in this respect Chicago holds a record never before equaled. Almost within the memory of living men it was a pioneer trading post on an unattractive, marshy site. In the year 1840, seven years after it was incorporated as a town, it contained 4,479 inhabitants. In the next half century the population figures went over the million mark to 1,099,850, and within the next two decades the two-million mark was passed. The census of 1910 gave the city a population of 2,185,283; according to a Federal estimate, this had reached 2,547,201 in 1917. It has thus outdistanced scores of Old World cities, besides Boston and Philadelphia, and is surpassed in the western hemisphere only by New York.

General Description. Chicago was originally built on flat prairie land only a few feet above the lake level, but between 1855 and 1860 the grade of a large portion of the site was raised ten feet or more, to provide a more secure foundation for building purposes. Though lacking in picturesque landscape features, the site was redeemed by the lake, along which the city now extends for twenty-six miles from north to south. The lake front, which is described in this article, gives the city an exceedingly beautiful outlook. Chicago's two and a half million

inhabitants live within an area of nearly 200 square miles, and it is in no sense a densely-crowded city. There are congested sections, it is true, but in the outlying districts there are still many open spaces. Chicago has space in which to grow, even without annexing the scores of populous suburbs that enclose it on the north, south and west.

The small Chicago River, with its northwest and southwest branches, divides the city into three districts called the North, West and South sides. In the downtown section of the South Side are the chief office buildings, banks, retail stores, theaters and hotels. The various branches of the elevated transportation system pass around the business district, forming the "Loop," and by that name the busiest section of the city is commonly known. It is here that congestion becomes serious, as tens of thousands of workers daily pour into the comparatively small area, besides an endless succession of surface cars, automobiles, trucks and teams. The shopping district, too, is within the Loop, for the great retail department stores, for which Chicago is famous, are all grouped on two sides of State Street, the main business thoroughfare. These stores—Marshall Field & Co., Mandel Brothers, Carson Pirie Scott & Co., Stevens, Rothschild's, The Fair, The Boston Store and Hillman's—form the largest group of their kind in the world.

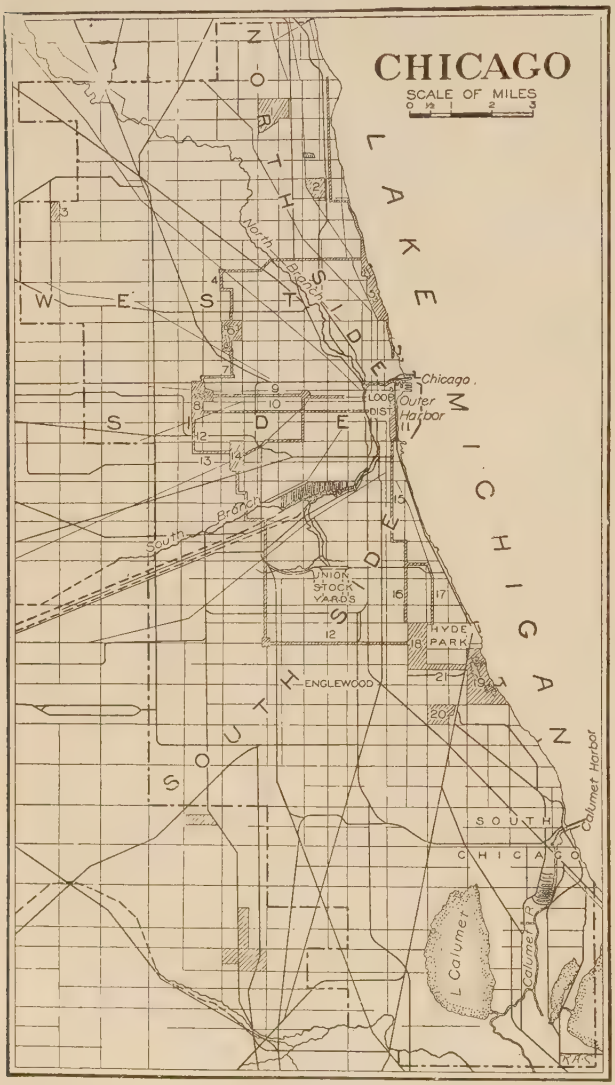
State Street is the third street west of the lake in the downtown district. One of the finest promenades in the world, Michigan Boulevard, bounding what is known as Grant Park, is the first street west of the lake. Grant Park comprises that portion of the lake front between Randolph Street on the north and Park Row on the south, about a mile in extent. For this distance along the west side of the boulevard there extends a row of buildings of varied and impressive architecture, including the Blackstone and Congress hotels, the Auditorium Hotel and Theater, the Fine Arts Building, Orchestra Hall, the McCormick, Railway Exchange, People's Gas and Monroe buildings, and the University Club, the last being the finest example of pure Gothic in America. Farther to the north are the Chicago Athletic Club and the Michigan Boulevard buildings. There are no buildings on the east side of the boulevard within this mile except the Art Institute, a beautiful example of Renaissance architecture, but just south of Park Row, at the foot of Twelfth Street Boulevard, a stately building of white marble was erected in 1918, giving an added touch of beauty to the lake front. This building was erected to house the valuable collections of the Field Columbian Museum (which see), formerly kept in one of the World's Fair buildings in Jackson Park.

The beautifying of the lake front is a part of the "City Beautiful" plan, worked out by Daniel H. Burnham. The work is proceeding gradually. Colonnades, statuary, fountains, a concrete wall and ornamented bridges have already been erected, and more ambitious projects are contemplated for the future. The lake front has become the great playground of the people; band concerts are given there on summer evenings, and working girls and boys go there for rest and recreation during the noon hours.

The streets of Chicago are regularly laid out; and they run usually north and south and east and west. Some of them, such as Western Avenue and Halsted Street, extend nearly the entire length of the city. In general the streets are broad, and the building line has been strictly observed through their entire length. A uniform system of numbering throughout the city enables one to find any point without difficulty. Madison, extending east and west, and State Street, extending north and south, are taken as the base lines and divide the streets crossing them into north and south and east and west. North and south streets are numbered from Madison, and east and west streets are numbered from State Street. There are 800 numbers to the mile, so the number tells the location and the distance from the base line.

Buildings of Note. In Chicago was built the first steel frame skyscraper, the Tacoma Building, but sometime later a law was passed forbidding the erection of buildings over 150 feet (later raised to 260 feet and afterwards lowered to 200 feet) in height, and the city has been distanced by New York in respect to lofty structures. This is due to the fact that Chicago builders have to go from seventy-five to 110 feet below the surface before they strike rock bottom, and it was considered unsafe to permit the unrestricted erection of tall, heavy buildings. One of the most impressive edifices of the downtown section is the combined city hall

and county building, a massive structure of steel and granite covering an entire block. The Federal Building, occupying the square bounded by Adams, Jackson, Dearborn and Clark streets, is sixteen stories high and is surmounted by a great dome 297 feet above ground level. With the exception of the lofty tower on the old Montgomery Ward Building, now known as the Tower Building, the tallest structure in the city is the Masonic Temple, of twenty-one stories. Built before the restricting ordinance went into effect, it is 354 feet in height.



1, Rose Hill Cemetery. 2, Graceland Cemetery. 3, Mount Olive Cemetery. 4, Humboldt Boulevard. 5, Lincoln Park. 6, Humboldt Park. 7, Central Park Boulevard. 8, Garfield Park. 9, Washington Boulevard. 10, Jackson Boulevard. 11, Grant Park. 12, Garfield Boulevard. 13, Douglas Boulevard. 14, Douglas Park. 15, Michigan Boulevard. 16, Grand Boulevard. 17, Drexel Boulevard. 18, Washington Park. 19, Jackson Park. 20, Oakwoods Cemetery. 21, Midway Plaisance.

La Salle Street, the Wall Street of the Middle West is lined with handsome buildings, housing the great banking and insurance corporations. Of special interest in this section is the Chamber of Commerce, fourteen stories high. An interesting feature of this costly structure is the great central court, roofed over by a huge skylight. Another massive edifice, at the foot of La Salle Street, houses the Chicago Board of Trade. Of the scores of great office buildings, one of the most artistic is the home of the Chicago *Tribune*, on Dearborn and Madison. It represents the Italian style of architecture, and is noted for its beautiful corridors of mosaic. The Marshall Field retail building is the handsomest of the department stores. It occupies the block bounded by State, Washington and Randolph streets, and Wabash Avenue (the second street west of the lake). An annex, twenty stories high, housing the Men's Store and scores of offices, has been erected opposite the main building on the south, the two being connected by a subway under Washington Street. As the store has forty-four acres of floor space, it far surpasses any other store in the world in size, and it is also unmatched in beauty of furnishings and equipment.

Parks and Boulevards. With over 4,600 acres of public parks and more than seventy miles of boulevard within the city limits, Chicago has a park system that is admirable in every respect. There are seven major parks and over thirty smaller ones. The two largest—Lincoln, of 517 acres, and Jackson, of 543 acres—lie along the lake, on the North and South sides, respectively. In the summer time both are visited daily by thou-

sands of families, and they are well equipped with boating lagoons, bathing beaches, tennis courts, baseball fields, golf links and recreation houses. Lincoln Park contains one of the finest zöological collections in the world, comprising about 1,800 animals, and an Academy of Natural Sciences, with 250,000 specimens. Jackson Park, which was the site of the great World's Fair, is connected with Washington Park (371 acres), by the Midway Plaisance, a magnificent boulevard 660 feet wide. The latter park has many recreation features, but is especially noted for its beautiful landscapes and charming views. From Washington Park one may drive by splendid boulevards to Marquette Park (323 acres), also on the South Side, and to the West Side parks, Douglas (182 acres), Garfield (187 acres) and Humboldt (206 acres). These are all provided with charming lagoons, recreation grounds, flower gardens, statues, drives and shrubbery; in Garfield Park is the largest tropical plant conservatory in the United States.

Scattered through the city are numerous smaller parked areas, breathing spots for tired humanity. The construction of these is continually going on, and great effort has been made to make them of value to the public through the installation of gymnasiums, swimming pools, skating ponds, playgrounds for children, reading rooms, etc. In many instances school yards of considerable area have been converted into neighborhood recreation centers.

Chicago's boulevard system is supplemented by miles of suburban drives. There is connection on the south with the magnificent highway system of Indiana; and Sheridan Drive, which traverses the city north of Lincoln Park, extends for miles through some of the most beautiful lake shore suburbs in the world. Many of the boulevards are beautified by central parked areas, and most of them are lined with palatial homes.

A Summer Resort. The moderating effect of the lake on the summer heat and its miles of beaches have brought Chicago into front rank as a popular summer resort. The largest of the beaches, at Clarendon Avenue, on the North Side, has a frontage of 774 feet and can accommodate 10,000 bathers at one time. A spacious bathhouse with lockers has been erected, and suits are provided for a nominal fee. This extensive beach is under municipal control. Another city-owned enterprise is the great Municipal Pier at the foot of Grand Avenue, over half a mile in length. The eastern end of the structure, jutting 660 feet into the lake, is devoted to recreation purposes. Free band concerts, patriotic rallies and community concerts are common occurrences in the great auditorium, and there is provision for dancing and refreshment. The pier is also the docking point of many of the lake excursion boats. Of the various resort hotels in the city, two are especially attractive because of their location on the lake shore—Edgewater Beach Hotel on the North Side, and Chicago Beach Hotel on the South Side.

Libraries. Chicago has three large libraries and a number of smaller ones. The Public Library, on Michigan Avenue, Washington and Randolph streets, is housed in one of the finest and most complete library buildings in the country. The interior is finished in Sienna and Carrara marble and glass mosaic and is remarkable for the beauty of its design. At the north end of the building is Grand Army Hall, finished in verde antique and containing in stone mosaic the badges of all the different army corps. The library contains over 500,000 volumes and besides the station at the central building, it maintains stations at the small parks and in various other localities in all parts of the city. These stations make the Public Library easily accessible to all. The Newberry Library occupies a magnificent granite building at Clark Street and Walton Place on the north side. It was established by the will of Walter S. Newberry, who bequeathed over $2,000,000 for the purpose. It contains about 200,000 volumes and is especially valuable for its works on history, literature and philosophy. The John Crerar Library, which has quarters on Wabash Avenue in the Marshall Field Building, contains over 275,000 volumes and specializes in the natural sciences, industries, medical research and social and economic sciences. This and the Newberry are reference libraries and are free to all who wish to consult them, but books cannot be taken away. The Chicago Historical Society has a valuable library of history, and there is also a good library in the Lewis Institute. Besides these there are a number of law and medical libraries maintained by private organizations, which are open to members. The University of Chicago maintains a library of over 400,000

volumes, which is primarily for the use of the students and faculty of the university, but may be consulted by the public on payment of a small fee.

Education. Chicago maintains an elaborate and complete system of public schools, ranging from the kindergarten to the Chicago Normal School. There are more than a score of high schools and nearly 300 elementary schools. The 358,000 pupils are taught by nearly 8,000 teachers, and the newer school buildings represent the highest achievements in modern architecture and equipment. Among the higher institutions of learning are the University of Chicago, located on the Midway Plaisance, near Jackson Park; Northwestern University, which has its law, dental and medical schools within the city limits, and the College of Liberal Arts in Evanston, a suburb; Lewis Institute; Saint Ignatius College, Loyola University and the Y. M. C. A. Institute. Among the special institutions worthy of note are the Chicago Musical College, the American Conservatory of Music, and the Art Institute. The latter contains an extended collection of paintings, statuary and antiquities, an art library, a lecture hall and a large number of classrooms. This institution enrolls about 2,500 students each year.

Institutions. The city contains hundreds of churches and a large number of hospitals, the most noted among which are the Cook County Hospital, the Municipal Contagious Hospital (opened in 1917), the Chicago Lying-In Hospital (1917), Saint Luke's, Mercy, the Presbyterian, the Michael Reese, the Alexian Brothers' and Wesley. The best known of the social settlements is Hull House, situated in the center of the Ghetto district on the West Side, and famous throughout the world for its original methods and its success. Other settlements which have also obtained a wide reputation are Chicago Commons, Chicago University Settlement and Northwestern University Settlement. The United Charities and the Bureau of Hebrew Charities maintain a corps of trained inspectors and workers, who give their entire time to the needs of the poor and the unfortunate and see that charity is properly and worthily bestowed. These are among the most important organizations in the city.

Water Supply and Drainage. The people of Chicago require about 575,000,000 gallons of water a day, and this vast quantity is brought to them by means of an elaborate system of cribs, tunnels and pumping stations. Nine tunnels under the lake convey the water from the cribs to the land tunnels, of which there are ten. The lake water is exceptionally pure under normal conditions, and has been so since the completion of the great drainage canal, which reverses the flow of water in the Chicago River and carries the city sewage to the Mississippi by way of the Illinois River (see DRAINAGE CANAL, CHICAGO).

City Transportation. Chicago's vast army of workers are brought to their places of labor by means of surface lines, elevated trains and the suburban divisions of several railway systems. The city government shares in the management of the surface lines and receives fifty-five per cent of the profits. The accumulated money, called the traction fund, will undoubtedly be used at some future date in the construction of subways to relieve the present congestion in the Loop. There are four great elevated systems, with about 200 miles of track. Three of these systems connect with suburbs on the west and north, and there is a mutual transfer system by means of which passengers may change from one line to another without paying an extra fare. With the exception of the congestion during the rush hours, at present unavoidable, Chicago's local transportation system is one of the best in the world.

Railways and Shipping. This city is the world's greatest railway center, forty per cent of the country's railroad mileage terminating here. Over thirty roads have their terminals in Chicago, and this number would probably be larger were there space for more trackage. Plans for a mammoth union station were halted by the entrance of America into the World War, as the government deemed it unwise to divert the vast amount of capital, labor and raw materials required, from war construction. At present passenger traffic is taken care of by six large stations, some of which are very much overcrowded. Most of the freight destined for Chicago is unloaded at a huge distribution center southwest of the city, and transferred to various smaller terminals within the city limits, and the principal commercial and industrial establishments are connected with these terminals by tunnels thirty-three feet below street level; there are sixty miles of these freight tunnels. Supplementing the railway system are fourteen hun-

dred miles of belt railroads encircling the city.

Chicago is also an inland port of first rank, and has lines of freight and passenger steamers connecting with all the large lake ports. In normal years over 6,000 ships enter and clear the port. Iron, grain and lumber are brought here in vast quantities, some to be reshipped to other centers. The construction of the Municipal Pier, mentioned above, greatly improved docking facilities. This pier is 3,000 feet long and 292 feet wide, and cost $4,500,000. The superstructure, of brick and steel, rests on a solid foundation of piling and concrete.

Manufactures. The location of Chicago as a distributing center and its proximity to the immense coal fields of Illinois have made it an important manufacturing center. The city has over 20,000 manufacturing establishments, which employ nearly 350,000 workmen. The largest of its industries is meat-packing and slaughtering, located in the stockyards district, between Thirty-ninth and Forty-third streets, on the South Side. Here are found the largest meat-packing houses in the world (see MEAT-PACKING). Next to the meat-packing industry in importance are the manufacture of foundry and machine shop products, iron and steel, clothing and agricultural implements, and printing and publishing. Because of the city's location in the center of one of the world's greatest grain regions, the manufacture of agricultural implements has become very important. This centers in the immense establishments of the International Harvester Company, the McCormick Harvester Works and the Deering Harvester Works. The total value of the city's manufactures is about two billion dollars a year.

History. The site of Chicago was visited by Marquette and Joliet in 1673. In the early French narratives mention is made of the *Checagou* River, that being the Indian name of the wild onion which grew profusely on the river banks. It is a true, if unromantic, detail that *Checagou* is also the Indian designation for the skunk. Other French explorers followed Father Marquette, but the first permanent settler was a negro from Santo Domingo, who built a cabin on the river bank in 1779. In 1804, the year in which the first Fort Dearborn was built, a white man, John Kinzie, became owner of the cabin, and at the same time won the dis-

Questions on Chicago

[An outline which can be used as a type for a city the size of Chicago will be found with the article CITY.]

What is the geographical position of Chicago, and how has it affected the growth of the city?

What was its per cent of increase between 1840 and 1910?

Why does not Chicago have such tall buildings as New York?

What is the Chicago "Loop"?

How does Chicago compare with other large cities as a retail shopping center?

Describe Grant Park and Michigan Boulevard.

What is the tallest building in the city? What is the name of the first skyscraper ever built?

What street is the Wall Street of the Middle West?

How many acres of floor space has the Marshall Field department store?

If you made a complete circuit of Chicago's major parks, how many would you visit?

What special features have the smaller parks?

Why has the city earned a favorable reputation as a summer resort?

What can be said about the north shore suburbs?

For what purposes is the Municipal Pier used?

How does the Public Library differ from the Newberry and John Crerar?

How many pupils are enrolled in the public schools of Chicago?

What is the source of the city's water supply?

How is freight carried from the railway terminals?

What does the name *Chicago* mean?

What disasters has the city suffered?

What is its leading industry?

When was the World's Columbian Exposition held?

How many cities in the world are larger than Chicago?

How many Presidents have been nominated in conventions in Chicago?

How does the Chicago River divide the city?

tinction of being Chicago's first white settler.

Fort Dearborn was erected on the south bank of the river. Its site, now marked by a memorial tablet, is one of the busiest spots in Chicago, at the foot of the well-named Rush Street Bridge. Though abandoned at the time of the Indian massacre of 1812, the fort was rebuilt four years later, and remained an honored landmark until 1856. After 1816 a busy little frontier village grew up about the fort, and by 1830 it was large enough to be platted. It then contained twenty-seven voters, and was nearly half a square mile in area. Cook County was organized a year later, and a post office was built at the corner of Franklin and South Water streets. In 1833 the town was incorporated, and in 1837 it received a city charter. In that year the area was ten square miles, and the population was 4,170.

From that time the young city enjoyed a steady growth. The completion of the Galena & Chicago Union Railroad and the Illinois & Michigan Canal in 1848 gave the place connection with the territory about it, and was the beginning of the city's supremacy as a transportation center. By 1870 it had a population of about 300,000, but the following year it was almost wiped out by a great fire that old settlers still talk about. Though the homes of 100,000 persons were destroyed and the property loss was $196,000,000, a finer and more substantial city quickly rose from the ruins.

The later history of Chicago is told in the statistics of its population, trade and industry. It has been the scene of serious labor disturbances, such as the Haymarket Riot of 1886, the Pullman car strike of 1894, and the teamsters' strike of 1904–1905, but its prosperous development has been uninterrupted. In 1893 the city welcomed visitors from all over the world, the occasion being the celebration of the 400th anniversary of the discovery of America. This celebration—a world exposition—is renowned as being the first world's fair of a really comprehensive nature (see WORLD'S COLUMBIAN EXPOSITION). Chicago has suffered from two disasters of comparatively recent date—the Iroquois Theater fire in 1903, and the overturning of the excursion boat *Eastland* in the Chicago River, in 1915. On both occasions hundreds lost their lives. Because of its central location and its splendid hotel and auditorium facilities, Chicago has become a favored place for political and commercial conventions. In this city ten Presidents of the United States have been nominated for the highest office in the nation.

CHICAGO, UNIVERSITY OF, a university located at Chicago, Ill., ranking with the foremost educational institutions in the United States. It is the outgrowth of a school of collegiate degree founded in 1857. The original university suspended in 1886 for want of funds, and the present institution is the result of efforts begun by the American Baptist Educational Society a short time later. The rapid development of the university was due largely to the generous donations of John D. Rockefeller, whose benefactions to 1919 represent a total of $35,000,000. The present university was chartered in 1890 and embraces five departments: (1) schools and colleges; (2) libraries, laboratories and museums; (3) university extension; (4) the university press; (5) the university affiliated schools.

In the arrangement of its terms the university of Chicago is different from other American universities. Instead of the traditional school year of nine months, the work of the year is divided into four quarters of twelve weeks each, and each quarter is divided into two terms of six weeks. The work is arranged by terms, and students may be absent any term or any quarter without loss of school time, since on their return they can enter classes taking up work where it was dropped when their vacation began. The schools and colleges are organized into junior and senior departments. The junior colleges contain courses of study corresponding to those of freshmen and sophomore years in most colleges; the senior colleges correspond to the work in the junior and senior years, and in them the courses of study are almost entirely elective.

Graduate work is provided in all departments, and for this the university is especially well fitted. The university extension division carries on extension work by means of lecture courses connected with study classes, and by correspondence work, through which a part of nearly every course in the university may be taken. It also assists this work by sending traveling libraries to centers where lecture courses are maintained.

The university campus lies along the Midway Plaisance, a magnificent boulevard connecting two of Chicago's finest parks. Be

cause of the large number of university buildings—numbering over twenty—the grounds are somewhat crowded, but the buildings themselves, representing a modified Gothic form of architecture, make a very impressive display. The institution has assets of more than $31,000,000, and its productive funds in 1917 had a value of nearly $23,300,000. There are over 485,800 volumes in the university libraries, and during a single year in normal times over 10,000 students enroll for work in all departments. The fall registration is about 4,000. There are nearly 400 faculty members, normally. In 1916 it was announced that a fund of $15,000,000 would be devoted to the development of a great medical department which would include Rush Medical College, for many years affiliated with the university, the Presbyterian Hospital and an undergraduate school to be built along the Midway.

CHICK'ADEE. See TITMOUSE.

CHICKAHOMINY, *chik a hom'i ni,* a river of Virginia that rises about twenty miles northwest of Richmond and flows southwesterly till it joins the James, sixty miles above Norfolk. The stream is not large, but it is noted for the numerous battles that occurred on or near its banks during McClellan's and Grant's campaigns against Richmond in the Civil War. The most important of these engagements were Mechanicsville, Williamsburg, Seven Pines, Gaines's Mill and the Battles of Cold Harbor. See CIVIL WAR.

CHICKAMAUGA, NATIONAL PARK, *chik a maw'ga,* a government reservation on the site of the Battle of Chickamauga, southwest of Chattanooga, Tenn. The park contains fifteen square miles; it was dedicated in 1895, and was the first great Civil War battlefield to be completely marked and preserved as a memorial of the war. Monuments and tablets occupy the historic spots and preserve for all time in the minds of men the incidents connected with one of the greatest struggles of that conflict.

Battle of Chickamauga, fought September 19–20, 1863, between a Federal force of 55,000 men under General Rosecrans and a Confederate army of 70,000 under General Braxton Bragg. Rosecrans approached Chattanooga, and Bragg, fearing that he would be besieged, retreated southward until he received reënforcements. The retreat was halted at Chickamauga, and Bragg prepared for battle, Rosecrans taking up a defensive position along Chickamauga Creek. On September 19 General Polk crossed the river and struck the Federal left wing under Thomas, but the latter repulsed the assault, inflicting a terrible loss.

On the following day the same position was again attacked without effect, but a misunderstanding of orders caused a breach in another part of the Federal line, and a concentrated attack by the Confederates caused all but Thomas's division to flee from the field. Thomas continued to grapple with his opponent, until he was summarily ordered to retreat. It was during this battle that he earned his sobriquet of the "Rock of Chickamauga."

CHICK'ASAW, a once powerful tribe of Indians living in Northern Mississippi and Tennessee. In 1540 De Soto reached one of their villages and, attempting to compel service from them, was attacked. The Chickasaw were always hostile to the French, but formed a friendship with the English. Their relations with the United States were usually friendly, and in 1834 they gave up their lands, receiving nearly four million dollars in payment. With this they bought land from the Choctaw, in the extreme western part of the Indian Territory, where they finally were recognized as the Chickasaw nation, under their own government. They were slaveholders and naturally sided with the South, but they submitted to the freeing of their slaves after the war. They are now prosperous citizens of the state of Oklahoma and of the United States. See FIVE CIVILIZED TRIBES.

CHICKASHA, *chik'a shay,* OKLA., founded in 1895 and named for an Indian tribe, is the county seat of Grady County, forty-two miles southwest of Oklahoma City, on the Saint Louis & San Francisco, the Santa Fe and the Chicago, Rock Island & Pacific railroads, and on the unnavigable Washita River. It has cottonseed oil mills, machine shops, railway shops, and a furniture factory. The city is one of the world's largest cattle-feeding points, and is a great cotton-concentrating town. The Oklahoma College for women is here, also Saint Joseph's Academy and a business college. Population, 1910, 10,320; in 1917, 16,234 (Federal estimate).

CHICKEN POX, a disease of childhood, characterized by an eruption of small red pimples, which appear in successive crops

on different parts of the body. Though highly contagious, chicken pox is rarely dangerous or followed by bad effects, if proper precautions are taken. Each day the patient's body should be sponged, and the eruption should be kept oiled. Cleanliness is very important, and the child should be watched to see that it does not scratch the pimples.

CHICLE, *chik"l,* a gumlike sap of a tree called the sapodilla, native of Central America and tropical South America. It has been naturalized in Mexico, particularly in Yucatan. The gum is used almost exclusively and in ever-increasing quantities in the manufacture of chewing gum (which see).

CHICOPEE, *chik'o pe,* MASS., a suburb of Springfield, three miles distant, on the Connecticut River and the Boston & Maine Railroad. The river furnishes power for large factories, which make rubber goods, tools, sporting goods, firearms, cotton goods, carpets; etc. The town has "Our Lady of the Elms," an academy conducted by the Sisters of Saint Joseph, and a hospital. The place was founded in 1640, became a town in 1848 and a city in 1890 by the annexation of Chicopee Falls, Fairview and Willimansett. Population, 1910, 25,401; in 1917, 29,950 (Federal estimate).

CHICORY, *chik'o ri,* or **SUCCORY**, a plant, native of Europe and Asia, but long since naturalized in the United States and Southern Canada. It has a fleshy root, spreading branches, coarse leaves and bright blue flowers. The leaves are sometimes blanched, to be used as salad. But the most important part of the plant is its long, fleshy and milky root, which, when dried, roasted and ground, is now extensively used for adulterating coffee. The presence of chicory in coffee must be stated on the label of the package, in accordance with recent pure food laws. Its presence may easily be detected by putting a spoonful of the mixture into a glass of clear, cold water, when the coffee will float on the surface and the chicory will separate and discolor the water as it subsides.

CHICOUTIMI, *she koo te me',* QUEBEC, the county town of Chicoutimi County, on the Saguenay River and Canadian Northern Railway, 227 miles from Quebec city. It is one of the most important centers for the manufacture of wood pulp, more than 60,000 tons being exported to England alone; other industries include foundries, machine shops, butter and cheese factories. Wheat, oats, hay, potatoes and blueberries are raised in large quantities in the surrounding region. The city is the seat of a bishop and has a Roman Catholic cathedral and college. Population, 1916, 6,500.

CHIFFON, *shif'on,* a word from the French, meaning in that language, *rag* or *flimsy cloth.* It is applied in English-speaking countries to a thin, gauzy fabric much used for women's veils, ruches, undergarments, dress trimmings, etc. It is marketed in a variety of colors, but chiefly in delicate shades. Both silk and cotton chiffons are in demand.

CHIHUAHUA, *che wah'wah,* MEXICO, founded in 1539, is the capital of the state of the same name, on the Mexican Central Railway, 750 miles north of Mexico City and 225 miles south of El Paso, Tex. It is generally well built and is supplied with water by a notable aqueduct. The industrial establishments include iron foundries, machine shops, and manufactories producing cotton and woolen goods, carpets, beer and other articles. The city is located in a rich mining section and has a large trade, being the leading commercial center in the northern part of Mexico. It was the scene of severe fighting between the forces of Villa and Carranza in 1913–1914. Population, 1910, 39,706.

CHILBLAIN, *chil'blane,* a small, oval or round patch of red, loose skin, appearing usually on the foot, but sometimes on the face, as a result of inflammation, caused by exposure to cold or frost. The inflammation is accompanied by stinging, itching and burning sensations and some soreness. Chilblain is caused by too sudden changes of temperature when the blood is not circulating well. Those who wear tight shoes and are not careful to keep the stockings dry and the feet warm are liable to suffer from chilblain. Helpful remedies include tincture of iodine, ichthyol and tincture of camphor.

CHILD LABOR. By this term we mean the hiring of children to work for wages. The tragedy of the working child is an old story, but men and women did not awaken to the abuses connected with child labor until the factory system began to crush the health and blight the lives of thousands of little citizens.

One who desires a vivid and heart-stirring account of what children have suffered in the past should read Arnold Bennett's *Clay-*

hanger. It was misery which he so graphically describes that aroused humane men and women in England to demand reforms, and it was in 1802 that the English Parliament passed the first law regulating child labor, as that term is understood to-day. While the law was a step forward, it merely forbade children in the cotton mills to work more than twelve hours a day; it did, however, stipulate that apprentices should receive elementary instruction. Fortunately, England did not stop there, but gradually enacted laws of a much broader scope, limiting employment to children above twelve years, and applying the principle to a wide range of industries.

On the continent similar laws were passed, and at the outbreak of the World War these statutes were being rigidly enforced. As was natural, the terrible demands made by that struggle on the industrial systems of the warring nations tended to weaken the enforcement of child labor laws, and large numbers of children from ten to fourteen were released from school and put to work on farms and in munition factories. The effect of war conditions on the children was a vital and serious subject in all the belligerent countries. An exhaustive report on this problem has been made by the Children's Bureau of the United States Department of Labor.

Child labor regulation is a more recent innovation in the United States and Canada. In the former country the rapid development of the industrial life of the nation after the Civil War brought with it a host of abuses in respect to employment of children, and as late as 1900 children under sixteen formed 13.3 per cent of all employees in American cotton factories. Thereafter the percentage declined. As the regulation of child labor is left to the states, the laws vary considerably. In general, they fix an age below which children cannot be employed in specified industries, and there are various regulations as to night work, length of working day, school certificates, physical qualifications, etc.

Previous to 1917 the age limit for factory work in over half the states was fourteen, and in a number of states young people under sixteen could work only eight hours a day. The entrance of America into the World War was the signal for a number of attempts to suspend the child labor laws, but this tendency was vigorously opposed by the National Child Labor Committee and various other organizations. In 1916 a national child labor law was passed by Congress, but this was declared unconstitutional by the Supreme Court in 1918. In Canada the subject of child labor is under provincial control, and great progress has been made. It is noteworthy that Canadian standards in respect to employment of children and women were in no respect weakened by war conditions, and this statement is true of the British colonies in general.

CHIL'DREN, SOCIETIES FOR, societies organized for the purpose of caring for children who are dependent, or whose parents are unable to care for them. The most important of these organizations in America are the Society for the Prevention of Cruelty to Children, the American Humane Association, Saint Vincent's Aid Society, the Jewish Relief Association and the Children's Aid Society. The first organization was established in New York in 1875, and similar organizations were soon started in other large cities of the country. The purpose is to shield children from immoral influences, to save them from inhuman treatment and neglect and, especially, to prevent their being sentenced by courts in large cities to confinement with professional criminals. The work of the aid and relief associations is given largely to finding homes for dependent children and for those whose parents are unable to care for them. These associations also maintain homes for crippled, blind and other defective children. Among the most important agencies for the protection of delinquent children is the Juvenile Court (which see). See, also, CHILDREN'S BUREAU.

CHILDREN'S BUREAU, a part of the United States Department of Labor. The bureau was established in 1912, for the purpose of investigating and reporting upon all matters pertaining to the welfare of children. Its work thus includes such problems as infant mortality, the birth rate, juvenile courts, child labor and any state legislation affecting children. It is not intended to relieve the states of responsibility for these problems, but to aid them in obtaining satisfactory solutions. Miss Julia Lathrop, for many years associated with Miss Jane Addams at Hull House, was appointed the first director of this bureau. See LATHROP, JULIA C.

CHILDREN'S DISEASES. There are certain diseases which are liable to attack children who mingle together in the schoolroom or elsewhere. If the mother can recog-

COMMUNICABLE DISEASES AMONG SCHOOL CHILDREN

Information for Parents and Teachers

Disease	Principal Early Signs and Symptoms	Method of Infection	Incubation Period	Exclusion	Remarks
Chicken-Pox	Onset gradual. May be no symptoms. Usually there is feverishness, but this may be very mild. Rash appears on second day as small raised pimples which shortly become filled with clear fluid; later scabs form. There may be successive crops of this rash up to the tenth day.	Fresh or dried exudate from eruption.	10 to 15 days.	Exclude child with disease* until all scabs have disappeared. Well children from same house may attend school.	When the child returns, examine the head for overlooked scabs and scales. A mild disease, and there are seldom any after-effects.
Diphtheria	Onset may be rapid or gradual. The early signs are those of sore throat with grayish-white patches on the membrane of throat, palate or tonsils. There may be swelling of the glands of the neck about the angle of the jaw. Later in the disease there is great prostration.	Discharges sprayed or thrown from the mouth or nose in coughing, sneezing or spitting. Diphtheria germs may be carried by an uninfected person or recently infected articles.	2 to 7 days; oftenest 2.	Exclude child with disease* until health officer gives permission to return. Exclude other children who are from the same home unless there is a change of residence, in which case exclude for 7 days, and then readmit if there have been no symptoms of disease and if children do not return to infected house.	This is a very serious disease. When more than one case occurs in a class-room all children suffering from sore throat should be excluded. Diphtheria varies greatly in its form, and mild cases are sometimes not recognized. They are however, as infectious as severe one, so that every precaution should be taken. Having had the disease confers no immunity.
Measles	Begins like a cold in the head, with fever, running nose, watery, inflamed eyes and sneezing. The rash appears about the third day and consists of small, irregular groups of dull-red, slightly raised spots. These are usually first seen on the forehead and face, and they rapidly spread over the entire body. The rash may almost disappear if the patient becomes chilled, but reappears when the patient again becomes warm. A positive sign of measles is the so-called Koplik spots. These are bluish-white specks upon a red ground which are best seen in the inside of cheeks opposite the molar teeth. Strong sunlight may be necessary to see these.	Discharges sprayed or thrown from mouth or nose in coughing, sneezing or spitting.	7 to 18 days; oftenest 14.	Exclude child with disease.* Child may return to school 8 days after disappearance of rash if nose and throat are free from discharges. Exclude other children who are from the same home unless there is a change of residence, in which case exclude for 14 days, and then readmit if there have been no symptoms of disease and if children do not return to infected house.	Measles is infectious even before the rash appears. After-effects are often more serious than the disease. Complications resulting in broncho-pneumonia and even tuberculosis are frequent, and account for the large death rate from this disease. Inflammation of the middle ear and weak eyes often result. Koplik spots are nearly always present in measles; they are not found in other diseases and they usually appear two or three days before the skin eruption, generally disappearing at the time of full eruption. Recognition of this sign will be very valuable in preventing an epidemic.
German Measles	Illness usually slight. Onset sudden. The rash is generally the first thing noticed. Unlike measles, there is no cold in the head, although the eyes may be inflamed and slight fever and sore throat may accompany the attack.	Discharges sprayed or thrown from mouth or nose in coughing, sneezing or spitting.	10 to 12 days.	Exclude child with disease. Child may return 7 days after disappearance of rash. Well children from same home may attend school.	German measles is usually very mild. The danger from it is slight, although none of the usual precautions should be neglected. Almost no after-effects.

Mumps	The onset may be sudden or gradual, beginning usually with slight fever, nausea, pain and swelling about the angle of the jaw. The jaws may be stiff and saliva sticky.	Discharges sprayed or thrown from mouth or nose in coughing, sneezing or spitting.	2 to 3 weeks.	Exclude child with disease* until all swelling has disappeared. This usually requires a period of three weeks. Well children from same home may attend school.	Mumps is very infectious. Early symptoms should therefore be noticed and patient immediately excluded. Defective hearing may be serious after-effect.
Scarlet Fever	The onset is usually sudden. Vomiting, sore throat, headache or fever may be first symptoms noted. Unlike measles, eyes are not watery or congested in beginning of disease. The rash usually appear within 24 hours and is seen first on the neck and upper part of the chest. It appears as fine spots, evenly diffused and bright red. Later the skin peels in scales, flakes, or large pieces. In the early part of the disease the tongue is usually whitish, with bright red spots resembling a strawberry.	Discharge from ears. Scarlet Fever germs may be carried by an uninfected person or recently infected articles.	1 to 7 days; oftenest 2 to 4.	Exclude child with disease* for a minimum period of 42 days. Exclude other children who are from same home unless there is a change of residence, in which case exclude for 10 days and then readmit if there have been no symptoms of disease and if children do not re- to infected home.	Scarlet Fever is dangerous, both during the attack and because of the after-effects. Slight attacks are as infectious as severe ones. There is great variation in the type of the disease, and many mild cases are not recognized, and are frequently responsible for starting severe epidemics. The peeling may last from 6 to 8 weeks from the onset of the disease. Second attack is rare. When scarlet fever is occurring in a school, all children with sore throat should be sent home.
Small-Pox	Onset apt to be sudden. Nausea and fever, accompanied by backache or headache. Rash is seen first about the face and wrists. It consists first of small red spots, which quickly become elevated and hard, like shot felt under the skin.	All discharges from nose, mouth, sores and scabs convey infection. Small-pox germs may be carried by an uninfected person or recently infected articles.	9 to 15 days; oftenest 12.	Exclude child with disease* until all crusts or scales have fallen off. Exclude other children from same home unless there is a change of residence, in which case exclude for 14 days and then readmit if there have been no symptoms of disease and if children do not return to infected home. Children who have been successfully vaccinated need not be excluded, provided there is a change of residence.	Small-pox is particularly infectious. After the occurrence of a case, all persons in the school or in the vicinity of the home of the patient should be vaccinated. Vaccination is a well-nigh perfect preventive.
Whooping Cough	Early symptoms resemble those of a cold in the head. Later there is a persistent cough which grows worse at night. The characteristic "whoop" does not develop until about a week or more after the onset of the disease. Spasms of coughing often end in vomiting.	Discharges sprayed or thrown from mouth or nose in coughing, sneezing or spitting.	7 to 10 days.	Exclude child with disease* until "whoop" ceases — usually a period of six weeks. Well children from the same home may attend school.	Whooping cough is especially infectious during the first few weeks. There is great variation in the types of the disease. Second attacks are rare. It may cause great debility. Frequently fatal in infancy. Indeed this disease causes as many deaths as scarlet fever.
Influenza or Grippe	Onset abrupt, beginning with feverishness, pain in head, back and limbs, and usually cold in the head. Chills. Lassitude is a characteristic symptom.	Discharges sprayed or thrown from mouth or nose in coughing, sneezing or spitting.	1 to 4 days; oftenest 3 or 4 days.	Exclude child with disease until catarrhal symptoms have ceased. Well children from same home may attend school.	Influenza is excessively infectious. After-effects often very serious and accompanied with great prostration and nervous debility. Many complications, such as pneumonia, croup, and chronic bronchitis.

(*) Notify parents and local health officer as speedily as possible.

nize the early symptoms of these diseases she can prevent needless delay in dealing with them. It is also important to know how long to keep a child excluded who has been ill. The accompanying chart conveys this information in concise form, and it should be of great value to teachers as well as parents.

CHILDS, George William (1829–1894), one of America's best-known and benevolent newspaper men and philanthropists. He was born in Baltimore, served for a time in the navy and later entered private business. He was long identified with the *Philadelphia Ledger,* one of the first cheap newspapers, was a heavy contributor to charities, erected many monuments to celebrities and educated more than 800 boys and girls. In 1890 he published his *Recollections.* He erected a Shakespeare memorial at Stratford, monuments over the graves of Edgar A. Poe and Richard Proctor, and a stone cross on the site of the first Christian church service in California. At Colorado Springs he built and endowed a Home for Union Printers. He paid for the education of 800 boys and girls.

CHILD STUDY, an educational movement for the scientific study of children. Child study is closely related to the biological sciences (see Biology) and is the direct outgrowth of physiology and psychology (see Psychology). Experimental and physiological psychology revealed the close connection of mind and body and showed that mental progress depended upon physical development. This led to more systematic study of the physical development of the child. The child's mental powers have also been carefully studied, and child psychology has become a branch of general psychology.

The movement for child study became established in the United States in 1880, and by the close of the century it was thoroughly incorporated into the educational systems of the various states. Departments of education in universities provide for training teachers and specialists in this line of research. Many state normal schools make provision for child study in their courses, and some of the largest cities employ specialists who devote their entire time to instructing teachers and to the study of children. The National Education Association and nearly all state teachers' associations now have departments of child study, which hold special sessions in connection with the annual meetings of these associations. Women's clubs are also engaged in some phases of the work.

In its most advanced stages, child study has become specialized and exacting. Its successful prosecution requires delicate apparatus and trained experts. Much of the work is along lines of original research and has for its purpose the discovery of facts and principles which will form a foundation for the care and training of children. This phase of the work can be carried on only in institutions especially prepared for it, such as schools of education connected with universities and the best equipped normal schools. The rate of growth of children is determined by measurement at different periods and for different months in the year. The growth of different organs, the relation of age to development in the sexes, the determination of the condition of the heart, blood vessels and nervous system at different periods, and the changes, physical and mental, which take place during the period of adolescence, are carefully noted.

There is, however, a more general line of child study and one in which both teachers and parents can participate. This does not require special apparatus nor technical training, though the latter is of great assistance. This line of study is confined to the careful observation of the child. Its purposes are to determine the development of the senses, to discover the child's interests, his strength and his endurance and to understand his physical and mental conditions. Careful observation leads almost every teacher to discover among her pupils those who are defective in sight or hearing. Because of such defects children often appear dull. If seated where they can have the best advantages for seeing or hearing, these pupils will ordinarily do the required work as well as the others in the class.

Children's dispositions, likes and dislikes, ability to apply themselves and other tendencies can best be studied in the home, and in ascertaining these facts the mother can coöperate with the teacher. The period of adolescence is often the most critical period in the child's life. It begins at about fourteen and continues until about twenty-four in males and twenty-two in females, the changes being more marked in the first two or three years of the period and varying in the degree of manifestation in different individuals. During this period both the boy and the girl need sympathy and encouragement. Because

of failure to understand the child's condition at this time, both parents and teachers often err in their management.

The results of the study of the child's mental development are seen in the radical changes which have taken place in the courses of study. Subjects which appeal to the child's interests at different periods of his development have taken the place of those which were dogmatic and abstract. Occupations for the hands, in the form of kindergarten plays, busy work and manual training, are now found in all well-systematized schools and assist in securing the development of all the child's powers. Methods of discipline have also been greatly modified for the better. Children are now led to control themselves, and cases of cruel and severe punishment seldom occur.

Related Articles. Consult the following titles for additional information:
Child Training Pedagogics
Kindergarten Psychology

CHILD TRAINING. Someone has said that the discovery of the child is one of the most significant events of the modern age. It can just as truly be said that child training is one of the most urgent of modern duties, for child training is preparation for life's career and for citizenship. To every thoughtful parent there is ever present the problem of so guiding the child that he will develop a character which will make for success and happiness. The following paragraphs will present to the parents some of the more important principles of child training; if these are carefully followed good results may be expected.

One of the first principles that presents itself is that each child is a distinct individual whose training gives rise to special problems, demands special methods and is entitled to individual thought and care. Nevertheless, there are certain basic principles that may serve as a guide for all parents.

The Parents' Attitude. It has aptly been said that the child is a wonderfully adaptable being, adjusting himself to all kinds of conditions, city and country, rich and poor, but that there is one thing he cannot be—namely, a grown-up. It follows that to make a success of parenthood one must deal with the child and his problems with sympathetic understanding. To put oneself in the child's place, to think and feel as he does, to get his point of view—this is difficult indeed, but it is indispensable, if the child is to be guided wisely. This principle cannot be disregarded in successful child training.

Self-Respect. Undoubtedly the reason for many bad results is the failure of parents to recognize the child's inherent sense of self-respect. Mothers and fathers who needlessly rebuke and punish children in the presence of guests, who ridicule childish efforts, who call attention to physical defects and otherwise wound the sensibilities of their boys and girls are pursuing a wrong course. Such tactics arouse antagonism and resentment, destroy the feeling of confidence that should abide in the child's heart, and nullify to a large extent many well-meant efforts at discipline. The normal child has a sense of justice and a feeling of pride. He wants what we call the "square deal." Unless parents respect this spirit they may sow seeds of deception, disobedience and sullenness in childish natures.

A helpful writer on the subject of child training—S. M. Gruenberg—says in this connection:

> "The heart knoweth its own bitterness," but seems to be unaware that others have troubles of their own. This is especially true in our dealing with children. We take it for granted that what is childish is trivial, and what is trivial is not serious. But the troubles of a child are just as serious to the child as the worries of a statesman are to the statesman. Parents can afford to make great sacrifices for the sake of retaining the confidence and companionship of their children. One of the essential means to this end is the patient efforts to understand the effect of seeming trifles upon the feelings of the child. * * * And we must consider, finally, how much of the callousness and indifference we find among men and women is the direct result of the constant bruising that their feelings suffered during childhood.

Self-Expression. The old saying, "Children should be seen and not heard," presupposes that children are a nuisance at best, and need to be constantly suppressed. Such a theory ignores the right of the child to express himself as a thinking, growing, spontaneous creature, and it overlooks the wonderful possibilities of character development that lie in the proper directing of child activity. To the little child, each day is a new era of discovery, and in his mind new ideas, aspirations and opinions are constantly taking form. It is as natural for him to give expression to the life within him as for the plant to put forth buds; repression of this wholesome instinct will hamper the growth of the mind and prove a bar to the development

of such positive traits as force, initiative and self-reliance.

Then, too, parents have an important duty to perform in connection with their children's attempts at verbal expression. "Language," says one authority, "is the tool by which we gain and garner information. If you blunt the tool before you begin to use it, how are you ever to get knowledge in any proper or real sense?" Language training should begin with the first efforts of the baby to talk. It should include the cultivation of correct habits of speech and the striking out of everything that is false. This means teaching the little ones to speak plainly and to pronounce correctly, to express their thoughts clearly, to call things by their right names, and to use good grammar.

To laugh at and encourage the funny mistakes little children are prone to make in their efforts at self-expression is nothing less than an example of waste. Sometime these inaccuracies and errors will have to be eliminated; then why permit them to take root? Children who enter school with careless habits of speech, who have never been trained to express themselves with reasonable clearness and accuracy, are just as truly under a handicap as the girl or boy with poor eyesight or with adenoids. Early language habits doubtless affect the whole after life. Many persons of mature age are hampered socially and in business life by their inability to give clear expression to their ideas. They cannot coördinate the thought and the spoken word. This is the result of their failure to receive language training during the impressionable years of childhood. Sometimes years of school training cannot suffice to overcome the effects of early neglect.

Every mother should take advantage of the period when her child begins to tell stories. Sometimes these are creations of the child's own fancy, but more often they are a repetition, in childish language, of the fairy stories and nursery tales told to children the world over. As the little one tells and retells these stories the mother may guide the lips to frame the pleasing phrase and the well-expressed sentence, and in this way instill good language precepts into the child's mind. This also affords opportunity for the correction of mispronounced words, slips in grammar, and the like. Indeed, the story-telling hour may be utilized most effectively for training in self-expression. Wise mothers will also make the attempts of the child to talk the basis of lessons in manners. At the table, for instance, the two-year-old may be taught to say "please," "thank you," "excuse me," etc. Many other opportunities for lessons in politeness will present themselves and should be utilized.

Initiative. The instinct to do something of its own volition is manifested early in the life of the child. The efforts of the baby to put on its own shoe and its attempts to undress and dress its doll are typical examples of this instinct, which, by the way, is the inspiration of much of the mischief that keeps the average mother constantly alert. Because initiative is a quality that has an important bearing on the development of character, it should be rightly directed and encouraged. Constant repression is unwise, and the effect on the child of hearing, "Don't do that," all day long is as pernicious as the effect of no regulation at all. The happy mean is to recognize the instinct as something which will be translated into energy and progress in later years, and to direct it into the right channels.

Uncontrolled initiative leads to destructiveness and waste. If the small boy persists in taking his toys apart in the hope of being able to put them together again, he should be supplied with tools or other apparatus by which he can exercise his fondness for construction. Children can be made happy and be kept out of mischief by means of scrap books, scissors and paste, beads for stringing, and the like. In fact, many of the activities of the kindergarten can profitably be adapted to home needs.

In some cases initiative is killed because the child is too carefully watched. Children who have everything done for them and are never permitted to wait on themselves or to act independently cannot develop the natural impulse to "start something." Many failures in after life are simply the result of too much coddling in childhood.

Imagination. It is evident that by the time children are two years old the picture-forming activity of the mind is fully awakened. From this time until they enter school, children live in a world of make-believe. To them a bundle of rags is a baby to be lovingly cherished and protected; a stick is a fiery steed; a line of books on the floor, a train of cars; a corner in the nursery, a den of wild beasts. Children do not

even require actual objects for the exercise of the imagination. Nearly every child, at some time in this period, creates a fanciful companion with whom he plays and talks. The story is told of a boy of two and one-half years who broke into wild sobs when one of his elders entered the nursery. On being questioned, he said that his baby sister had been stepped upon. Baby sister, to be sure, existed only in his imagination, but she was none the less real to him.

What is the significance of this picture-forming activity in child training? All educators agree that it has very positive value. The imaginative faculty is creative. It has given the world its useful inventions, its noblest works of art, its literary masterpieces. It sharpens the powers of observation, strengthens memory, and is an aid in the acquisition of knowledge. Furthermore, it is largely responsible for the sympathy that manifests itself in generous donations to charity; sympathy depends upon one's ability to visualize the sorrows of others. The child who grows up with his imaginative powers active is better qualified to win success and happiness than the child of dull imagination.

Parents should therefore welcome the make-believe instincts of their children, and encourage rather than repress them. At the same time it is not wise to permit the imaginative powers to run riot. Psychologists tell us that there is nothing more detrimental to character development than arousing the moral feelings without getting a corresponding translation of good impulses into *action*. The same principle holds true in the field of the imagination. The child who loves to dream rather than to do must be carefully guided, so that he will not become one of those unfortunate beings who have never learned to crystallize dreams into achievement.

There is another phase of this subject that is a serious problem to many mothers. So long as children invest the objects about them with life and live in a world of their own making, they will naturally make statements which are not true. But the stories that are born of an active imagination should not, in the case of little children at least, be called lies nor be treated as such. It is doubtful whether children ever lie consciously before the age of four or five. Their moral perceptions along that particular line are not yet awakened. A time does come, however, when the child must be taught the distinction between truth and falsehood.

Mrs. Gruenberg, quoted above, gives some helpful advice on this point when she says:

> If scolding or preaching could make a child merely stop telling such stories, there would be no gain; if they stopped a child thinking such stories, there would be a decided loss. Gradually the child may come to recognize the difference between the make-believe and the reality, and he may be helped. When at a certain age you think your child ought to distinguish more clearly between his imagination and cold facts, it would be all right to explain to him that, although there is no harm in his enjoying his make-believe, still he must not tell his fancies as if they were real, but must tell them as make-believe stories. That will achieve the desired result without making him feel hurt at your lack of understanding in treating him like an ordinary liar.

Questions. After his third birthday the average child begins to find life one big question mark, and as a result his elders are subjected to a ceaseless flow of requests beginning with *how, what* and *why*. Curiosity is a valuable trait, because it is an avenue to knowledge, and parents should therefore treat the questions of their boys and girls seriously. To give satisfactory answers is often a tax on one's time, patience and ingenuity, but no mother or father can afford to check the childish effort to learn. It is not true, however, that all kinds of questions have the same value. There are children who, simply for the sake of talking, will follow each answer with another "Why?" and show clearly that they have no real interest in their questions. Parents can usually detect purposeless and mechanical questioning, and they should discourage it.

The pictures in their story books and peculiarities of their various toys frequently stimulate the curiosity of children. The small boy wants to know why the wheels go round in his automatic engine, or why his toy lamb has a woolly coat. The little girl brings her picture book to mother and asks why the elephant has such a funny nose. Questions of this nature should be answered carefully. It sometimes happens that the parents discover their own lack of knowledge when they try to explain commonplace facts to their children. In such cases a conscientious effort should be made to obtain the desired information. It is also an excellent plan to suggest to the child how he may find

his own answers. By relating what he has already learned to the information he seeks the child takes a definite step forward in mental development.

Training the Will. The distinction between a strong character and a weak one is that in the one case the will power has properly developed and in the other it has not. It follows that the mother should lay the foundation for her child's success and happiness by systematic training of the will. Such training, to be effective, must begin in the nursery. To be sure, the newlyborn child does not will to do anything, but its first impulsive movements constitute the basis for the exercise of the higher power. The baby cries when it is hungry and is quieted by being fed. It instinctively feels the needs of exercise, and moves its arms and legs. In time the effects of these acts are associated with the acts themselves; movements which at first are impulsive become deliberate, and finally the child purposely acts to satisfy its desires.

During the first two or three years the little ones are too limited in knowledge and experience to be guided by reason. In this period the parents' will must dominate that of the child. There must be a higher authority to see that the child eats and sleeps regularly, that it does not play with the scissors, or experiment with matches, and so on. That is, the baby cannot have any will of its own in questions concerning its health and safety. Now, many parents fail at this stage in child training because they do not carry out the idea of control to its logical conclusion. Childish demands that do not entail actual injury are yielded to because it is too much trouble to refuse, and the baby never really learns the lesson of obedience. The period of infancy is exactly the time to impress the idea of submission to authority, and firmness at this time means a saving of strength and effort later.

Occasionally one hears a mother say, "My child has such a strong will that I would ruin his character if I tried to break it." The problem of the stubborn child is indeed perplexing, but wilful persistence in having one's way is a sign of weakness, not of strength. Even in nursery days the child can learn the vital lesson that individual desires must yield to what is best for the good of all. If the children do not learn this they will have a sorry time when they have to meet life's problems in later years. And the two-year-old who lies on the floor and shrieks when his demands are not granted, or who flies into a rage when thwarted, is demonstrating an uncontrolled will, not a strong one. Babies learn very quickly whether or not they can get their way by having "tantrums," and exhibitions of screaming and passion usually tell a story of parental laxity.

There is another side to this problem that the parents should not ignore. In imposing their will on the child they should see that they are themselves reasonable and considerate. It sometimes happens that the elders are the ones who are obstinate and wilful, rather than the children. The impatient father who insists that his two-year-old boy stop his play so that he can read his paper, the parents who suppress innocent childish activities because they interfere with the comfort of the elders—such guardians of children are placing submission to authority on a thoroughly selfish basis. They are failing to see that all training should have for its aim the good of the child, not the convenience of the parent.

As the children pass from the period of infancy, constructive training of the will becomes very important. Because the will expresses itself through action, it can be trained most admirably through the performance of tasks that demand of children concentration and perseverance. Even very little children can be trained to pick up and put away their toys, to fetch things for mother, and to perform simple duties about the house. What is essential is that the child be trained to carry through to completion certain definite tasks to which he sets himself. Moreover, in early childhood the boys and girls should acquire habits of punctuality, neatness, politeness, etc. As every mother knows, even the week-old baby easily forms habits of regularity in respect to feeding and sleeping simply through repetition. So the older child, required to do a certain thing, not once, but many times, acquires regular habits, such as washing its teeth, putting away its playthings, or saying "please" when asking a service.

The problem of obedience, too, assumes another character when the children pass beyond the age of infancy. It is hardly fair to the eager little petitioner of four or five to say, "No, you can't do that," and give no

other reason than "Because I say so." Mothers who talk matters over with their children, and when possible tell them why certain things are forbidden, can always count on their loyalty. After all, parents should not expect blind, unreasoning submission from reasoning boys and girls. The child who yields to his mother because he knows that she has justice on her side and who gives up his own desires because he feels that it is the right thing to do, is exercising will power in the best sense of the term.

and girls, should bear in mind that persistent effort to establish good habits and wholesome ideals has a greater positive value than correction and punishment. Undoubtedly a large proportion of the punishment meted out to children is nothing more or less than an admission of failure on the part of the persons training them. What has been said in the discussion on constructive training of the will could very properly be repeated here, for the parent who has made good conduct the natural and habitual

CHILD TRAINING CHART

PERIOD OF INFANCY—THE FIRST THREE YEARS

Year	Character Development	Intellectual Development	Sense Development	Play and Exercise	Rest Period
1.	Submission. Control of desires.	Learning to understand spoken words.	Awakening of the five special senses.	Use of arm muscles in playing with toys. Creeping.	Sleeping from 22 hours to 16 hours a day.
2.	Quick responsiveness to commands. Greater self-control.	Talking.	Special development of tactile senses.	Walking. Playing with more elaborate toys. Using spoon, cup and plate.	Sleeping 12 hours at night. Daily nap.
3.	Showing initiative. Developing unselfishness and gentleness.	Reciting nursery rhymes. Use of picture books.	Activity of all the senses. Distinguishing tastes and colors.	Using pencil. Stringing beads. Plays involving the imagination. Great physical activity.	Sleeping 12 hours at night. Daily nap.

EARLY CHILDHOOD—FROM THREE TO SIX YEARS OF AGE

4.	Kindness to animals. Good manners. Patience. Overcoming peevishness.	Hearing stories told. Use of alphabet blocks. Learning to count.	Distinguishing smells.	Simple games. Taking walks. Picking up toys. Helping to dress and undress.	Sleeping 11 hours at night. Daily nap.
5.	Generosity. Orderliness. Intelligent obedience.	Hearing stories read. Printing letters. Learning names of months.	Continued development of all the senses.	Helping with simple household tasks. Sewing. Using simple tools.	Sleeping 11 hours at night. Daily nap.
6.	Truthfulness. Sense of honor. Self-reliance.	Memory development. Learning to combine small numbers. Spelling short words.	Continued development of all the senses.	Dressing. Making scrap books. Clay modeling. Driving hoop. Tricycle or velocipede.	Sleeping 11 hours at night. Nap as needed.

Discipline and Punishment. There can be no hard and fast rules for the discipline and punishment of children, because every child is a distinct individual. All mothers know how children vary in the degree with which they respond to suggestion, and how one boy's behavior may demand twice the thought and care that his brother's does. But every parent, no matter what may be the temperament and disposition of his boys

thing in the child's life has already solved the problem of discipline.

There are three theories as to the function of punishment: that its purpose is to make the offender suffer; that it should have a deterrent effect and prevent a repetition of the act; and that it should bring moral reformation. An ideal form of punishment would possibly accomplish all of these aims, but certainly the basic idea in punishment

should be to make the children better, not to make them suffer. This latter idea is uppermost in the mind of the parent who violates the cardinal rule of *never punish in anger.* Take a typical case:

A small boy has been told that he must keep out of the pantry. He forgets this admonition, and goes in when mother is busy elsewhere. She hears a crash and runs into the pantry to find that he has upset a pan of milk on the floor. To her this means a good deal of inconvenience, for she must send out for more milk and must clean up the floor. So she loses her temper, and proceeds to give the boy a "sound spanking" then and there. On the part of the mother we have a case of uncontrolled nerves, temper and a desire to "get even" with the child. On the child's part we have fright, resentment and possibly the desire to "get even" with his mother.

Now, the child has misbehaved in disobeying his mother, and it would have been unwise for her to overlook this fact. What was at fault was her method of discipline. She did not stop to consider anything except that the boy was a trouble and she was angry. Had she made it plain to him why he was to keep out of the pantry? Prohibitions of this sort do not always make clear impression on the mind of a little child. Was there some special reason why he forgot her wishes in the matter? Perhaps some pet belonging of his had been carried into the pantry and he instinctively went after it. Would she have accomplished more if she had talked to him kindly about his naughtiness, pointing out the trouble he caused her on a busy day, and telling him he must go without his favorite custard at lunch because he had spilled the milk and there was no time to get any more?

The point in this illustration is that no attempt was made to be just and reasonable—as we say in law, to judge the case on its merits—and when parents fail to take into consideration the circumstances of an act, when they neglect to consider the motives and temptations of the little wrong-doer, when they condemn hastily and in anger, punishment fails at reformation, which is the thing it ought to accomplish. "Punishment," writes one observer, "is a medicine—a corrective—and when we administer it we must do so in the spirit of the physician. Like physicians worthy of their trust, we must study the ailment and its causes, and above all, we must study the patient. The same remedy will not do for all constitutions."

Children are too often punished merely because their childish ways are an irritation to some nervous or selfish elder. While rude and boisterous manners should not be tolerated, a certain amount of noise is inevitable if there are children in the home. Noise is usually an expression of health and good spirits, not a sign of perversity. It is not just to an active child, for example, to punish it for playing somewhat noisily on a rainy afternoon, because some older person in the house happens to be irritable. On the other hand, it is good discipline to ask children to remain quiet for an hour or so until baby has finished her nap, or because mother has a headache. Here is an opportunity to inculcate the idea of consideration and thoughtfulness.

The question of corporal punishment is oftentimes a perplexing one to the conscientious parent. Authorities are divided into two distinct schools on this point—those who believe in sparing the rod and spoiling the child, and those who believe in spoiling the rod and sparing the child. Professor Berle, in his *The School in the Home,* says:

"If there is anything in this wide world that does not teach the wisdom of corporal punishment I do not know what it is. What I know of the world and human life teaches me that nature administers the sharpest kind of corporal punishment for every violation of her laws. Why not administer the knowledge of these natural forces before the time when the realization of their awful penalties and inexorable character involves not only fearful pain, but often the ruin of life and happiness? You can teach this sort of thing to a small child as readily as you can anything else."

On the other hand, there are those who say that corporal punishment is not only unnecessary, but brutalizing; that violence does not bring out the best in a child's nature, and the same results may be obtained through more refined modes of punishment.

This is a question that must be settled by the individual parent in accordance with the character and problems of his own child. There are children so sensitive that a stern rebuke alone is a severe punishment and will bring immediate results, and there are others who, as harassed parents testify, seem to be afraid of nothing but the whip.

Undoubtedly, whipping is absolutely harmful in some cases, and has proved beneficial in others. As is true of any other form of punishment, the infliction of pain depends upon the child, the nature of the offense, and the circumstances under which it was committed, and no hard and fast rule can be given except that a child should never be whipped in anger, nor needlessly and carelessly.

In conclusion, it should be remembered that the aim of discipline is to strengthen the will of the child to love the good and avoid the evil. The test of the efficacy of any punishment is the addition it makes to the moral forces in the child's character. If the methods pursued prove an aid in the formation of good habits, if they teach the wisdom of right conduct and the beauty of noble ideals, then the parents may justly feel that they have found the happy medium in the matter of discipline and punishment.

The Child's Health. This is a feature of child training that cannot be disregarded, for no child can develop normally unless he has a foundation of physical well-being. Defects of sight and hearing, child diseases and other abnormalities need, of course, the attention of a skilled physician. Here will be discussed some of the important rules for keeping children well who are in normal health. An abundance of fresh air is essential for the well-being of all children. The windows of the sleeping room should be opened at night and the nursery be kept well ventilated. Exercise in the open air should be carried on daily, except when the weather prevents. Children should be taught to breathe properly. A few exercises each day in deep breathing will prove very helpful. The food should be simple and nutritious and such laxative foods as oatmeal, bran bread, fruits and vegetables be included in the diet. Do not give growing children rich pastries, stimulants or too many sweets. Both the teeth and the digestion suffer from excessive eating of candy. Only confectionery made of pure ingredients should ever be tolerated. Teach the child to use the tooth brush. This instruction should begin as soon as possible after the first teeth have come through. Bodily cleanliness and simple, comfortable clothing are always desirable. See that the children are properly protected in cold or rainy weather, but do not burden them with elaborate clothing that interferes with their activity. Help the children acquire healthy bodies by keeping the home atmosphere sweet and clean. Do not talk ill health or permit morbid ideas to get a foothold.

House of Congress, Santiago

CHILE, *che'la*, or *che'le*, one of the three leading countries of South America, closely joined with Brazil and Argentina for unity of action in behalf of the whole continent. Their united purpose in diplomacy has linked them together as the "A-B-C countries." Chile is not so fortunately situated as the other two countries named, for it is on the Pacific Ocean side of the continent, and is further separated from direct connection with the progressive part of the world by the massive range of the Andes Mountains along its entire eastern boundary.

Picture a country whose average width is less than the distance from New York to Philadelphia or from Chicago to Milwaukee, but whose land surface extends in a line 2,700 miles from north to south, with snow-capped mountain summits thousands of feet high in the east, and sea level from seventy to 250 miles to the west. In length the country extends as far as from Cuba to Hudson Bay, or across the United States on the 40th parallel. Such is the form and the varied surface of Chile. It has been aptly termed the *shoestring republic.*

The land area contains 295,575 square miles, which is twice as great as the area of Montana. The population in 1912 was 3,505,317, more than 3,000,000 being natives, of Indian descent. Chile is fourth in population among South American countries, and seventh in size.

The People. The representatives of the aboriginal people of Chile are of the race commonly known as the Araucanian, distinguished by endurance, valor and courage. The educated classes consist almost entirely of the descendants of the Spanish conquerors, and these have preserved the language, religion and social customs of Spain. Many of the inhabitants represent a mixture of European, Indian and negro blood.

Surface and Drainage. The southern portion is mountainous and is covered with

heavy forests, and it is notable for a large number of coast islands and for deep fiords which enter the continental plain. The Andes form an unbroken wall on the eastern boundary, averaging 6,000 feet in height in the south and 15,000 feet in the north.

The Chilean Andes are more heavily clad in snow than any other part of the range, and there are many glaciers, especially in the south. North of latitude 33° there is no rainfall for years at a time, and there are large deserts, among them being Atacama and Tarapaca. The region in the central part of Chile is well watered and fertile and is adapted to grazing and the cultivation of grain. The rivers of Chile are directed westward across the country. There are none of great size, the largest and the longest, the Bio-Bio, having a length of 200 miles.

Climate. The climate of Chile is exceedingly varied. In the north the climate is sub-tropical; that of the central valley is healthful and pleasant; in the southern portion it is exceedingly wet, some regions being too wet for the growth of cereals.

Mineral Resorces. Chile is one of the chief mineral-producing countries of South America. The most important mineral product is nitrate of soda, which occurs in large beds in the northern deserts (see NITRATE). The deposits yield an annual product of about 1,300,000 tons and give employment to over 24,000 men. Gold is obtained chiefly from the river sands, but the yield is not very great, being less than the silver product. Copper ores, next to the nitrates, are the most important mineral resources of the country. Cobalt and nickel are also mined, and zinc, iron, mercury and alabaster are found in small quantities.

Agriculture. The agricultural activities of Chile are mostly restricted to the great central valley. It is estimated that about one-half of the population is engaged in agricultural pursuits, but an obstacle to the development of the farming resources of the country is the rapid development of nitrate mining, which gives employment to so many of the inhabitants. The most important crops are wheat, maize and barley. Next to cereals, the most important agricultural industry is grape raising. Industrial plants, such as flax, hemp and tobacco, are also cultivated to some extent. Live stock and alfalfa are exported from the north; potatoes, flax, barley, honey, fruit and wheat from the central part, and timber, potatoes and apples from the southern portion. The principal timber tree is the cedar; other important trees are the Araucanian pine, the beech, the evergreen and the quillaya, the bark of which is of considerable commercial importance. Cattle-raising has made rapid progress. Sheep and goats are very numerous and thrive especially in the central region.

Manufactures. Chile is not a manufacturing country. The nitrate of the north is largely shipped out of the country without undergoing manufacturing processes. In the south, where there are large German interests, there are breweries, distilleries and mills of various kinds. In other parts of the country are a few iron mills, glass factories and shoe factories. The natives cannot be induced to become factory operatives, as a rule.

Transportation. The first railway line was opened in 1852, but the construction of railroads on a large scale was not begun until 1888. In 1915 the total length of railways in operation was about 5,025 miles, of which 3,236 miles were operated by the government. Many new railway lines are being projected. A new and important road was opened in 1912 from Arica to La Paz, Bolivia. There are regular steamship sailings around Cape Horn to Europe and others up the coast to Panama. The Panama Canal brings Chilean ports several thousand miles nearer North Atlantic ports than formerly. There are about 20,000 miles of telegraph lines and eight wireless stations. A new wireless system, completed in 1918, connects Juan Fernandez Island, 400 miles distant, with the mainland. There were 45,000 miles of telephone line in 1918.

Education. Public instruction, though provided by the state, is yet in an unsatisfactory condition. It is free, but not compulsory. Secondary instruction is also offered. The state university at Santiago, the capital, gives courses in law and political science, medicine, pharmacy and fine arts, and there are, besides these, a second university, schools of agriculture, mining and other technical institutions, normal schools and military and naval academies. Sixty per cent of the inhabitants cannot read.

Government and Religion. The executive power is vested in a President, who is elected for five years by electors chosen by popular

vote; he is not eligible to reëlection. He is aided by a Cabinet of six Ministers, who are in charge of the seven departments of government, and also by a Council of State of eleven members, five of whom are nominated by him and six by Congress. The legislative department consists of a Senate and a Chamber of Deputies, the former elected for six years and the latter for three. There are twenty-five provinces in the republic. The Roman Catholic Church is sustained at public cost, but other churches are tolerated. The priests possess an immense influence over the people, who look to them for aid in politics as well as in religion.

History. In 1541 the conquest of Northern Chile from the Incas of Peru was begun by Valdivia, who was successful in 1550. The Araucanians in southern Chile kept up the struggle for two hundred years and were never wholly subdued. In 1810 Chile revolted against Spain and was successful, with the aid of General San Martin, in gaining independence, which was proclaimed in 1818 and formally recognized by a treaty with Spain in 1844. In 1865 Chile and Peru were engaged in war with Spain, which lasted four years. In the war with Peru and Bolivia fourteen years later, Chile was successful and added to her territory the territories of Antofagasta and Tarapacá. There have been a few revolutions since, but none of lasting character.

In 1896 there was a serious boundary dispute between Chile and Argentina, which was happily settled. A great statue, *Christ of the Andes,* stands on the boundary line, in commemoration of the peaceful settlement of the controversy (see ARGENTINA, subhead *History*). Towards the World War, which engaged nearly the whole world, Chile announced its position as that of strict neutrality, notwithstanding the fact that the majority of South American republics had joined the allies in declarations of war upon Germany or had expressed sympathy with the allied cause. Possibly a deterring influence existed in the fact that German officers had trained the Chilean army, and most of its officers are yet Germans.

Related Articles. Consult the following titles for additional information:

Andes
Cape Horn
Concepcion
Magellan, Strait of
Patagonia
Punta Arenas
San Martin, José de
Santiago
Tierra del Fuego
Valparaiso

CHILE CON CARNE, *chil'i kon kar'ni,* a preparation of fried chicken, red peppers, salt, onions, cloves of garlic, butter and flour. The name, which is Spanish, means *peppers with meat.*

CHILLICOTHE, *chil i kahth'e,* OHIO, the county seat of Ross County, fifty miles south of Columbus, on the Ohio & Erie canal, the Scioto River and on the Baltimore & Ohio, the Norfolk & Western and the Cincinnati, Hamilton & Dayton railroads. The city was settled in 1802 and was the capital of Ohio from 1800 to 1810. The valley is a rich agricultural district and has extensive coal mines. The industrial establishments are railroad shops and manufactures of wagons, engines, pads and shoes. Population, 1910, 14,508; in 1917, 15,625 (Federal estimate).

CHILLON, *shil lon',* or *she yoN',* a castle and fortress in Switzerland, situated at the east end of Lake Geneva, on an isolated rock, standing out from the edge of the lake. It was once an important stronghold of the Counts of Savoy, and the prison house of Francis Bonnivard, prior of Saint Victor, Geneva, from 1530 to 1536. It has acquired interest from Byron's poem, *The Prisoner of Chillon,* which relates the story of Bonnivard.

CHILLS AND FEVER. See MALARIA.

CHIMBORA'ZO, a mountain of Ecuador, in the province of Quito, about 120 miles from the coast. Though not the loftiest summit of the Andes, it rises to the height of 20,703 feet above the level of the sea and is covered with perpetual snow 2,600 feet from the summit and upward. In 1880 it was ascended to the top for the first time by Whymper.

CHIMERA, or **CHIMAERA,** *ki me'ra,* in classical mythology, a fire-breathing monster, with the head of a lion, the body of a goat and the tail of a dragon. He was killed by Bellerophon (which see). To-day the word is used commonly to signify any frightful or foolish fancy.

CHIMES, a variety of music, of medieval origin, mechanically produced by the strokes of hammers against a series of bells, tuned to a given musical scale. The hammers are lifted by levers, acted upon by pins, or pegs, projecting from a cylinder, which is made to revolve by clock-work and is so connected with the striking part of the clock mechanism that it is set in motion by it at certain intervals of time, usually every hour, or every quarter of an hour.

CHIM'NEY, a structure, generally of stone or brick, containing a passage, or flue, by which the smoke of a fire or furnace escapes to the open air. The longer the chimney, the more perfect is its draught. The principle involved in the action of a chimney is that a column of heated air is lighter than a column of cool air of equal height. In the mixture of the warm and cool air, the result is that the weight of the latter forces the warm air upwards, and thus an upward movement of air is produced. Chimneys are not of great importance in warm climates, but in cooler regions the proper building and care of them require special attention.

The tallest chimney ever built is at Great Falls, Montana; it is 506 feet high and seventy-four feet in diameter at the base. It cost about $200,000. Next in size among the world's chimneys is one in Saxony, in the old German Empire; it is 460 feet high and has a base thirty-three feet in diameter. A great kodak company in Rochester, N. Y., has a chimney 356 feet high; one in Butte, Montana, rises 350 feet, and there is one in New York City, built by a street railway company that is three feet higher, or 353 feet.

CHIMNEY SWIFT, or Chimney Swallow. See SWIFT.

CHIMPAN'ZEE, the native Guinea name of a large, manlike African ape, of the same genus as the gorilla. When full-grown it is sometimes about five feet high, but it is not so large and powerful as the gorilla. Its body is covered with coarse black hair, which is very long on the head and shoulders. The chimpanzee walks bent over, with its knuckles resting on the ground, though it is able to go erect. It feeds on fruits, often robbing the gardens of the natives, and constructs a sort of nest among the branches of the trees. It is common in menageries, where it shows much intelligence and docility. The chimpanzee is indeed the most intelligent of the apes. See APE.

CHIMPANZEE

CHINA, the largest country of Asia. Long before Greece and Rome rose to power a unique and elaborate civilization had developed in this country, and to-day it is an older nation than any of the great European powers. Yet, with all its background of antiquity, China took no part in the history of the world at large until the nineteenth century. Suspicious of the civilizations developing in other continents, confident that its modes of thought were superior to Western ideals, China through the ages and well into the modern period remained a land of mystery, untouched by the currents of progress flowing about it. Its recent awakening has brought with it many surprising readjustments. That this ultra-conservative nation is now a republic is perhaps the most amazing fact connected with its modern history.

Location, Size, Population. China occupies most of the southeastern third of Asia. It is made up of China proper, consisting of eighteen provinces; and of various outer provinces and dominions, as shown in the table below. The figures given are in some cases estimates, but they may be taken as reasonably accurate for the Chinese domain as it existed in 1918:

DIVISIONS	SQ. MILES	POPULATION
China proper	1,532,789	*302,111,334
Manchuria	362,483	*12,742,360
Sinkiang (including Turkestan)	550,579	*1,768,560
Tibetan marches (of Szechwan & Yunnan)	.....	195,496
Children under six years, (estimated)	.....	9,000,000
	2,445,851	325,817,750
Mongolia	1,076,292	†1,800,000
Tibet (including Koko-Nor and Tsaidam)	756,000	†2,000,000
	4,278,143	329,617,750

*Not including children under six years.
†Estimate.

It is evident that the population total is greater than that of any other national unit on the earth. The British Empire has a larger total, but it is made up of widely scattered peoples. China proper, with which this article is chiefly concerned, has over

three times as many inhabitants as the United States, and is only half as large. For descriptions of the divisions of China see TURKESTAN, MANCHURIA, MONGOLIA, TIBET.

Surface and Drainage. China proper is divided into three regions—the great central plain, extending west from Peking to the Hoang-Ho, or Yellow River, and southward to the Yang-tse-kiang; the western highland, from the Hoang-Ho westward to the border; and the southeastern region, which consists of lowlands and hill country. The western region is generally high and mountainous, with numerous deep valleys through which flow mountain streams tributary to the Hoang-Ho and Yang-tse-kiang. In the southeastern portion there is no very high land, though the country is decidedly hilly, so that it is well drained along the valleys of the Hoang-Ho and Yang-tse in the great plain. In the southeast are the most fertile regions, and it is in these that the population is the most dense and that agriculture is brought to the highest degree of perfection found in the country.

The most important rivers are the Hoang-Ho, flowing in an irregular course from northeast, east, south and then northeast, and watering the northeastern portion of China; the Yang-tse-kiang, which has a general northeasterly course and flows across the southern part of the country, and the Pi-Ho, which drains the region around Peking. Each of these rivers is navigable, and all are important waterways. The Hoang-Ho has changed its lower course many times in the last few centuries, and on such occasions it has caused much destruction to life and property, earning for itself the name "China's Sorrow." In 1917, 12,000 square miles in Chi-li province were submerged. The valleys of all these rivers are densely populated. Lakes are few and small, the largest being Tung-ting-hu, which is about sixty miles long and located near the center of China. In the northern part of the country the surface is covered with a deposit of brownish-yellow earth of remarkable fertility.

Climate. The greater part of China belongs to the temperate zone, but it has what is called an excessive climate. At Peking in summer the heat ranges from 90° to 100° in the shade, while the winter is so cold that the rivers are usually frozen from December to March. At Shanghai the maximum temperature reaches 100°, and the minimum falls at least to 20° below freezing point. In the south the climate is of a tropical character, the summer heat rising to 120°. Here the southwest and northeast monsoons blow with great regularity and divide the year between them. Among the greatest scourges of the country are the dreadful gales known as typhoons (see TYPHOON). They never fail to cause great devastation, though happily they always give such timely notice of their approach that preparations can be made. The Hoang-Ho and Yang-tse-kiang basins have a rather equable temperature, due to the soft, moist winds of the Pacific.

Mineral Resources. China is well supplied with minerals, the most important of these being coal and iron and inexhaustible beds of kaolin or porcelain clay. The largest coal field known in the world exists in the highlands in the province of Shan-si, where extensive beds of anthracite occur. West of this province is an extended deposit of bituminous coal, and other fields are found west of the Hoang-Ho, while smaller fields, but equally important because of their location, are found west of Peking. Coal fields also occur along the Siang and Lei rivers and at various places in the valley of the Yang-tse. Iron ore is found in the vicinity of the coal regions in Shan-si,, as are also limestone and potter's clay.

The most important iron works in China, located across the river from Hankow, are controlled by the Japanese. In the province of Yun-nan, in the extreme southwestern part of China, are found deposits of tin, copper, silver, lead, and gold. Antimony ore is exported in large quantities from Hunan. Salt occurs in the valley of the Hoang-Ho, near the great bend where the river turns eastward, and also in the southwest part of Yun-nan. Lack of transportation facilities and the absence of suitable tools and machinery prevent the extensive development of these minerals, but 18,000,000 tons of coal were produced in 1915, and the same year China produced six per cent of the world's production of tin.

Vegetation and Animal Life. See ASIA, subheads *Vegetable Life* and *Animals of Asia.*

Agriculture. With the exception of extremely mountainous regions, all of China is covered with a fertile soil, which will admit of successful cultivation as far as 7,000 and 8,000 feet above the sea. Agriculture is the most important industry and

the one most highly venerated. Under the empire, once a year the emperor, in the presence of the highest court officials and royal family, turned a furrow and sowed some seed in the honor of agriculture. Land is divided into small holdings, the largest farms never exceeding a few acres in extent. While the most primitive methods and implements are used, the exceeding care and patience of the Chinese in fertilizing and tilling the soil assure good crops, and they obtain the largest annual yield per acre of any farmers in the world.

The land along the hills and on the upper levels is often irrigated by water from the streams. Since these hills are graded into terraces, the entire country, in many of the river valleys, has the appearance of a vast garden. The water is raised from the river by wheels containing buckets. These are operated by animal power or by men. The first wheel raises the water to the first level, a second takes it from this to the next, and so on until it has been transferred to the highest point in the district to be irrigated. From this point it is distributed through small channels, so that each section of land receives its share. The traditional veneration for ancestors interferes with agriculture, for in some sections one-sixth of the tillable area is covered with graves which must not be disturbed.

Rice is the principal food of the people and is by far the most important crop. Most of this is grown in the middle and southeastern sections of the country. In the latter, two mature crops are obtained each year, and a third crop is usually grown, which is plowed under green for manure. In the northern and northwestern sections, a variety known as dry-soil rice is cultivated like ordinary grains. In this region, also, wheat, corn and other cereals are abundant. The raising of vegetables is also an important industry. Next to rice, from a commercial point of view, the most important crops are tea and the mulberry, which is the food for the silkworm (see SILK; TEA). Ginseng, tobacco, sugar cane, indigo and numerous plants valuable for their roots are raised, and in the southern part of the country cotton is also grown to some extent.

Manufactures. The Chinese have made considerable progress in manufacture, though they were long opposed to the introduction of the tools and machinery of progressive nations. Within recent years modern methods of manufacture have been adopted, and in certain industrial centers the manufacture of iron and steel is carried on. Modern flour and rice mills have also made their way into this land of conservatism. The leading manufactures are silk, cotton and woolen goods. Finer grades of silk are produced in China than in any other country of the world. The embroidery of silk is also carried on with remarkable proficiency, showing a high degree of mechanical skill and the finest artistic taste. Silk is the most common fabric for clothing of the wealthy classes and is prescribed for the raiment of all public officials of high rank. The poorest people also manage to deck themselves in coarser varieties—if not as a common article of apparel, at least on festive occasions. The manufacture of a fabric known as grass cloth is also important. This has an appearance of linen and is valuable in the manufacture of clothing.

Another important industry is the manufacture of chinaware, in which for centuries the Chinese excelled all other nations, but their productions are now surpassed by certain European countries. Lacquer ware is also made in large quantities. The metal work most deserving of notice consists in the manufacture of small articles, such as gongs, mirrors and statuettes in copper and bronze, and in the production of various kinds of carved and filigree work in gold and silver. The Chinese are also noted for their skill in making small articles from ivory, wood, shell and mother-of-pearl, such as card cases, seals, combs and chessmen. Many of these objects are remarkable for their beautiful carvings.

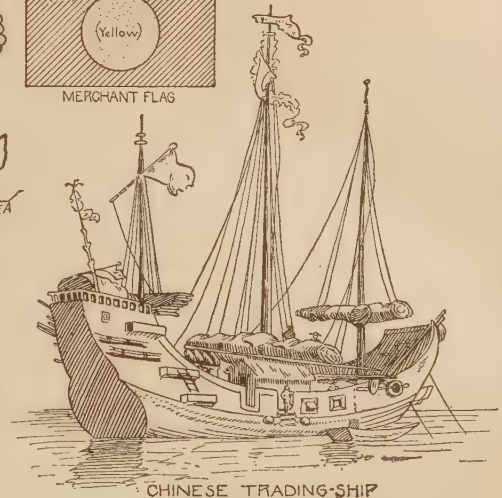
Transportation and Commerce. The inland trade of China is very extensive, so large that its amount cannot readily be estimated. The rivers and canals swarm with boats, junks and barges of all sizes. Roads in the interior are entirely lacking or are so poor that they will not admit of the passage of wagons. For this reason water communication is all-important, and the great rivers, such as the Hoang-Ho and the Yang-tse-kiang, furnish the chief outlet to the sea. The Yang-tse is navigable for large steamers for more than 1,100 miles and for smaller boats for a considerable additional mileage. The Grand Canal connecting Hankow with Tien-tsin, 700 miles long, has been in use since the eleventh century and is still an im-

CHINA

NATIONAL FLAG

MERCHANT FLAG

PAGODA



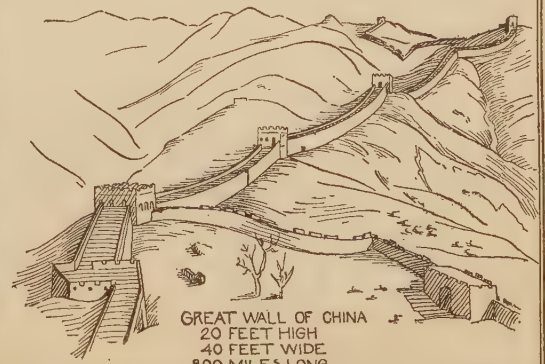
CHINESE TRADING-SHIP
PRESENT DAY

CHRONOLOGICAL SUMMARY

MIGRATION OF CHINESE FROM THE WEST, ABOUT	3000 B.C.
CHOW DYNASTY FOUNDED	1122 B.C.
PHILOSOPHER LAO-TZE BORN	600 B.C.
PHILOSOPHER CONFUCIUS BORN	551 B.C.
TSIN DYNASTY FOUNDED	225 B.C.
GREAT WALL BUILT	3RD CENTURY
BUDDHISM INTRODUCED FROM INDIA	190 A.D.
TANG DYNASTY FOUNDED	618 A.D.
MANCHU DYNASTY FOUNDED	1644 A.D.
REPUBLIC OF CHINA ESTABLISHED	1912 A.D.

THE CHINESE WERE THE INVENTORS OF GUNPOWDER AND OF THE ART OF PRINTING.

PALANQUIN—COMMON MODE OF TRANSPORTATION



GREAT WALL OF CHINA
20 FEET HIGH
40 FEET WIDE
800 MILES LONG

·H·M·HAINES·

portant waterway. Considering the extent of the country, railroads are few. In 1917 there were about 6,575 miles in operation, including Manchurian lines, and 2,500 were projected or under construction. In 1917 American surveyors were making plans to build 1,500 miles of railway through the richest section of China. When completed they will open up six new provinces to foreign trade. Important concessions to Japan have been made in regard to construction work in Manchuria.

The foreign commerce of the country amounts to about $625,000,000 a year. Of this over $300,000,000 is in imports. Cotton goods are the chief imports, silks the chief exports. The foreign commerce is carried on through what are known as treaty ports, cities specially opened by government decree to foreign trade. There are forty-eight such cities, some of them being on the great rivers, several hundred miles inland.

Spheres of Influence. The leading nations in foreign trade are India, Great Britain, the United States, Germany and France. Because of the tendency of the Chinese to retain all the customs of their ancestors, customs which are so far removed from modern business methods as to greatly impede commercial transactions, the leading European nations have secured special privileges extending over certain territories. These are known as spheres of influence. Previous to the Russo-Japanese War Manchuria and Port Arthur were practically under Russian control. Hongkong and the neighboring cities on the coast are under British influence. Until the World War the region around Kiaochau was under German influence. These spheres of influence are not controlled by foreign governments, but within them each government is granted special concessions, which give its citizens advantages over those of other foreign nations in the same territory.

The People. The Chinese belong to the Mongolian race, but they do not represent the harsher features of this race, as found in the genuine Tartars. They are of low stature, have small hands and feet, a dark complexion, wide forehead, straight black hair and eyes and eyebrows obliquely turned upward at the outer extremities. The queue is the most striking thing in their appearance. They are inferior to Europeans and Americans in bodily strength, but are superior to most other Asiatics in their physical endurance. They have many excellent moral qualities, are strongly attached to their homes, hold age in respect, are unusually industrious and toil continually for the support of their families. In the interior, where they have not been corrupted by contact with foreign nations, they exhibit remarkable simplicity of manners. However, the Chinese are not free from vices. They are noted for treachery and for their untruthfulness in dealing with strangers. They are exceedingly polite in their intercourse with one another, but this politeness often lacks sincerity. Gambling is a universal vice among them. Opium smoking has been materially lessened through government intervention, but cigarette smoking has taken its place.

Their food consists largely of rice, fresh pork, fish, fowls and vegetables. Beef and mutton are seldom used. Tea is the universal beverage and is drunk in large quantities. Among the poorer classes the larder includes seaweed, fungus growths, silkworms, rats, cats and even refuse.

With rare exceptions, the men and women of the household are kept strictly separate. Marriage is universal and is provided for at an early age, and the negotiations are conducted by parties who devote themselves to match-making. The marriage ceremony is characterized with gay processions and other festivities. While polygamy is not sanctioned by law, it is often practiced. Women are considered far inferior to men and have practically no social or educational advantages. Among the poor, baby girls are sometimes killed soon after birth. The cruel practice of binding the feet of girls is, however, on the wane.

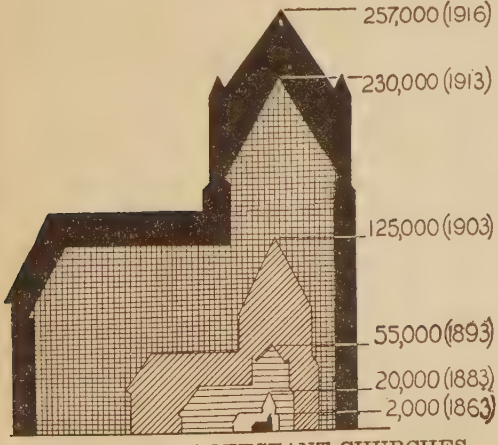
The houses are usually of one story and built of bricks, earth or thatch, with brick tiling for a roof and wood for the interior. The interior contains a series of rooms which are separated and lighted by intervening courts and communicate with one another by side passages. In the best houses there are chambers set apart for the worship of ancestors, and in these religious ceremonies are regularly performed.

Government. From the beginning of history until our own time China was an empire, more or less absolute according as the ruling sovereign was strong or weak. The crown was nominally hereditary through the eldest son, but it was not unusual for the emperor to designate as his heir a younger

favorite son or some other near relative of marked ability. The emperor was honored and worshiped as the "Son of Heaven," and in matters of legislation and administration his authority was supreme, except that his actions must conform in a general way to certain principles laid down in the sacred books of Confucius. As a matter of fact, however, the government was a bureaucracy; the governing class was composed of Manchus. While the officials were compelled in theory to obey the emperor without hesitation, in practice they were allowed considerable freedom, and thieving, extortion and oppression were characteristic of the administration.

After various attempts to reform the government proved of little avail, a republic was established in 1912 and the Manchus driven from power. In 1914 a permanent constitution was promulgated. The executive power is vested in a President who is assisted by a Cabinet of nine members. In case of his death he is succeeded by the Vice-President. The Premier, or head of the Cabinet, is nominated by the President; the other Ministers are named by the Premier. All appointments require ratification by the Parliament, which consists of a Senate of 264 members and a House of Representatives of 596 members.

Religion. The principal religious beliefs are Confucianism, Buddhism and Taoism. Confucianism and Taoism were developed within the country, but Buddhism was introduced from India. Christian missionaries are usually tolerated, although occasionally some of them are murdered by anti-foreign fanatics. There are possibly a million followers of the Roman Catholic faith, and various Protestant denominations have established missions. In 1916 the Protestant churches had a membership of 257,000. Mohammedanism is represented by 20,000,000 persons. Under the old empire Confucianism was practically a state religion, and the emperor, as the Son of Heaven, publicly practiced the sacred rites of the worship of Heaven. Yuan Shi Kai in 1914 attempted to restore this official worship, but he was unsuccessful.



GROWTH OF PROTESTANT CHURCHES
The diagrams graphically portray the increase in membership among the native population.

Education. Until 1905 education in the Chinese classics was considered the ideal of all educated Chinese, and special classes were held to give instruction in philosophy and literature. Examinations were held frequently and successful candidates were awarded degrees which entitled them to hold civil service positions. This system was abolished in 1905, and an attempt was made to introduce general education according to Western methods. As yet about ninety-six per cent of the people can neither read nor write, but the government is endeavoring to remedy this condition. Primary and secondary schools leading to institutions of higher grade have been established, and the University of Peking is at the head of the entire system. Tien-tsin has a university, an Anglo-Chinese college and a number of special schools. There are about 1,600,000 pupils enrolled in schools of all grades; 110,000 are in mission schools. At Chefoo there is a mission school for the deaf, the first of its kind opened in the country.

Cities. China contains a large number of great cities, but most of these are merely aggregations of people, and only a few are of political or commercial importance. Among these are Peking, the capital; Hankow, Tien-tsin, Canton, Shanghai, Nanking, Fuchow and Hong-kong.

Language and Literature. The Chinese language is the most important and most widely spread of the so-called monosyllabic languages of Eastern Asia, in which each word is uttered by a single movement of the organs of speech. There is no alphabet, and each word is represented by a single symbol or character. The same word may stand for a number of different ideas, and its exact meaning must be decided by its position in

the sentence. There are also certain words which are attached to other words to show grammatical relations. As there are only about five hundred simple syllabic sounds in the Chinese language to do duty for a vastly large number of ideas, a system of tones is employed. Some sounds may be pronounced in as many as eight different tones, each of which has a different meaning; and it is this system of tones which makes the language so difficult for a Westerner to learn. The written characters in the Chinese language were probably originally hieroglyphics, or rude copies of the objects designed to be expressed by them; but the hieroglyphic features have almost entirely disappeared, and many of the symbols are formed of what seems to be an arbitrary combination of lines. Most of the written characters are formed by a combination of the old ideographic element with a phonetic element. In writing or printing, characters are arranged in vertical columns, to be read from top to bottom.

The Chinese are a distinctly literary people, and their literature is unquestionably the most important of Asia. It dates back perhaps to the twentieth century B. C., but the first important volume of which we have knowledge was written in the twelfth century B. C. This was one of the "Five Classics," or *King*, which formed the oldest and one of the most important parts of Chinese literature. The "Four Books," written by Confucius and his disciples, are next in value to the earlier "Five Classics." Among the most important works which have been produced in China are the historical and geographical works, and writings on the sciences and on philosophy are also numerous. There are, too, voluminous collections of poetry and numerous dramas and novels which have never been made known to Europe.

History. The early history of China, which, according to some authors, reaches back for hundreds of thousands of years, is enveloped in mystery; and not until the twenty-seventh century before the Christian Era was there a ruler of whom we have any record. Even of this ruler little is known beyond the fact that he built roads and organized the empire into administrative departments. With the reign of Yao in 2356 B. C., Confucius begins his record, and although his statements cannot be taken for authentic historical information, his accounts of Yao and his successors, Shun and Yu, give a general idea of the epoch. These kings greatly extended the empire and ruled so well and so justly that they have been regarded as the model for all rulers since their time. Their successors lacked their virtues, however, and by 1766 B. C. a new dynasty had arisen, known as the Shang dynasty. The most of the rulers of this line, which reigned until 1154 B. C., were unfitted for ruling, and the country prospered little under them. Better times came to the empire with the accession of the Chow dynasty in 1122 B. C. It is certain that under this dynasty internal improvements took place in the country; the people changed generally from their former nomadic life to a settled agricultural existence, and civilization reached a comparatively high point for that early date. It was during this dynasty, about 551 B. C., that the great Confucius was born. Internal feuds disturbed the empire, and by 255 B. C. the Chow dynasty was overthrown by the Tsin or Chin dynasty, from which China takes its name.

One of the rulers of this line, wishing to have his own reign go down in history as the beginning of the empire, destroyed all the literature which dealt with previous ages and had over four hundred learned men buried alive that they might not produce new records. He was defeated in his project, however, by the fact that the books of Confucius were discovered later. It was during the Tsin dynasty that the great Chinese Wall was erected to keep out the Tartars. From the days of the Tsins a number of dynasties have ruled China, some of which brought the country to a very high point. Under the Tang rulers learning was especially cultivated. In A. D. 924 printing was invented, and the practice of binding the feet of the women was introduced at about the same time.

In the thirteenth century the Mongols overran China and established the Mongol dynasty. Kublai Khan, the most famous of the Mongol rulers, brought China to a point of splendor which it had never attained before. During his reign Marco Polo, the Venetian traveler, visited China and brought back accounts of the high state of civilization which it had attained. Under the reign of the Ming dynasty, which ruled from 1368 to 1644, the Portuguese visited China and settled at Macao. Under the last half of

this line internal affairs in China became greatly disturbed. Rebel bands throughout the empire menaced the throne itself, and finally, to put down these rebels, the Manchus were invited into the country. They did indeed put down the rebel armies, but when their object was accomplished and the Chinese wished them to retire, they refused to do so. They took possession of Peking and proclaimed a Manchu prince emperor, thus founding the last royal dynasty of China. Opposition to the new rulers gradually died out, and the conquerors, who were of course greatly inferior in numbers to the conquered, were gradually merged with the original inhabitants of the country. Almost the only custom which the Manchus forced upon the Chinese was the wearing of the cue, or pigtail. The most famous of the Manchu emperors was Kang-hi, who reigned from 1662 to 1722. He was no less remarkable as a scholar than as a general, as is proved by the dictionary of the Chinese language which was published under his superintendence. Tibet was ceded to the emperor during his rule, and the country was exceedingly prosperous. The one great disaster was the earthquake at Peking, in which, it is said, 400,000 people were killed.

From its earliest days China has shown an unconquerable aversion to intercourse with other countries. As long, however, as English trade relations were conducted through the East India Company, matters were generally satisfactory, because the Chinese, unable to understand the political standing of the company, treated with them as with a company of merchants with whom no diplomatic relations were necessary. When in 1834 the monopoly of Chinese trade was taken from the East India Company and the British merchants were represented in China by a commissioner appointed by the British government, misunderstandings at once arose. The opium trade was the chief cause of disagreement. All traffic in opium had been decreed illegal by the Chinese government, but the decrees had never been strictly enforced. When, however, in 1837, the Chinese government did determine to enforce its edicts, the British government, to whom the opium trade was worth millions of dollars annually, refused to act with China. As a result, war broke out in 1840. The struggle was most disastrous for China, and in the treaty of peace which was signed in September, 1842, the English were given permission to trade freely at Shanghai, Ningpo, Fu-chow, Canton and Amoy and received Hong-kong, besides an indemnity of $21,000,000. No mention was made of the opium question. Two years later the United States and France each succeeded in making a trade treaty with China, similar to the one which Great Britain had made.

In 1856, as China refused redress for certain grievances of Great Britain, war again broke out between the two countries. France joined England, and the struggle was not terminated until 1860, when the allied armies took Peking. This war, which, added to internal troubles, had seemed an unmixed calamity, proved to have its compensations, for the foreign powers after the treaty with China showed themselves ready to help her in putting down a severe rebellion which had arisen in the empire. Hung-siu-tseuen, a schoolmaster who through reading Christian tracts had grasped some idea of the Christian religion and had convinced himself that he was a Heaven-sent ruler, headed a rebellion which in the three years after 1850 reached great dimensions. The rebels had seized Nanking, which they had made their capital, and Hung-siu-tseuen had had himself proclaimed the founder of a new dynasty, to be called the Peace dynasty. A small army, under the leadership, first, of an American, Ward, and later, under the leadership of Charles George Gordon, finally succeeded in putting down the rebellion, which is generally known as the Tai-ping Rebellion (see GORDON, CHARLES GEORGE).

The ten years that followed witnessed a general revival of the strength of the empire. In 1894 China became involved in a war with Japan (see JAPAN, subhead *History*). Difficulties in Korea, over which China claimed suzerainty, led to the interference of the two powers, and their inability to agree as to the future government in Korea at last brought on open war. China was completely defeated in the struggle and was forced, in 1895, into a treaty which ceded to Japan the island of Formosa and the peninsula of Liao-tung, on which was situated Port Arthur, China's strongest fort. China also promised the payment of an indemnity of about $150,000,000. The European powers, especially Russia, were by no means willing to have the Liao-tung peninsula given up to Japan. Russia herself had been for years

very anxious to gain possession of an ice-free port for her Siberian territory, and Port Arthur seemed to offer the most favorable outlet. In conjunction with France and Germany, therefore, she brought such pressure to bear upon Japan that she gave back to China all of the ceded territory except the island of Formosa. Russia, as the price of her interference, obtained special privileges, among them a lease of the city of Port Arthur.

For a time after the close of the struggle with Japan, it seemed as if the reform party in China might gain the upper hand and bring China into a closer relationship with other nations. The great influence of the empress dowager, however, finally made reactionary measures prevail, and anti-foreign demonstrations broke out in many parts of the country. By decree of the emperor, practically all power was placed in the hands of the empress dowager, and it was generally felt that she was encouraging, tacitly, at any rate, the outbreaks in various parts of the empire. In Shan-tung the organization popularly known as the Boxers became active. The origin of this movement is obscure. Its name is derived from a translation of the Chinese name, "The fist of righteous harmony," and it appears to have been originally a secret association of men chiefly from the lower classes. It is not known whether the empress and her advisers deliberately turned the revolutionary movement into channels where it would work against the foreigners, rather than against the imperial government, or whether they carelessly allowed it to grow until it was beyond their control; at any rate, even when the Boxers carried about banners on which were inscribed, "Exterminate the foreigners and save the dynasty," the representatives of the powers at Peking were able to secure no measure against them.

Matters went from bad to worse. In May 1900, a number of Christian villages were destroyed, and many native converts were massacred in the neighborhood of the capital. In June, the chancellor of the Japanese legation was murdered, and later in the same month the German ambassador, Baron von Ketteler, was assassinated. The foreign representatives, with their households and guards, collected in the British legation, which they fortified, and here they were besieged by the Chinese troops. Not until the fourteenth of August did the allied forces of Japan, Russia, England, America and France reach Peking and relieve the legations. They were just in time, for the situation of the besieged had grown desperate. Peking was taken by the allies, the imperial court escaped into the interior and the army marched through the sacred Forbidden City. After some months of negotiation with Li Hung Chang and Prince Ching, the terms of peace agreed upon were submitted to the imperial government. The treaty provided for an indemnity to be paid to all states, societies and individuals who had suffered in the rising; forbade the importation or manufacture of arms or ammunition; threatened with death any members of anti-foreign societies, and provided for the fortification of the legation district and the occupation by the foreign powers of certain strategic points between the capital and the coast. In February, 1901, these terms were accepted.

The political unrest next showed itself in a demand for constitutional reform, and on September 20, 1907, an imperial edict announced a plan for a national assembly. While this and other promised reforms only added strength to the demands for complete representative government, the more extreme reformers had been preaching revolution against the Manchu dynasty. In October, 1911, rioting broke out in Wuchang, on the Yangtse River opposite Hankow, in connection with a great railroad strike. Imperial troops were sent to enforce order, but their presence furnished an excuse for a general uprising against the Manchus. Yuan Shi Kai, who had been appointed Prime Minister in an attempt to save the dynasty, tried to compromise with the revolutionists, but failed. The imperial family and most of the high Manchus left Peking on December 28, and on February 12, 1912, the Manchu dynasty resigned all rights to the throne.

The Republic. The conviction that the Manchu dynasty must come to an end was driven home to the court by the organization of a provisional republican government, under the presidency of Dr. Sun Yat Sen, an educated and widely-traveled patriot, who had urged revolution against the Manchus as early as 1896. An agreement was reached between the republicans and the imperialists by which Yuan Shi Kai should succeed Sun Yat Sen as provisional President. This change was made in March, 1912,

and the republic was regularly established.

As President, Yuan Shi Kai naturally wanted the constitution of the republic to provide a highly centralized government, with great power in the hands of the President, but it was not until he had quarreled with the new national assembly and had dissolved it that he had his way. Under this constitution he became, on October 10, 1913, the first regularly elected President of the republic. His position was no easy one. He had already, in the July previous, suppressed a serious revolution in the southern provinces, he had great difficulty in meeting the expenses of government, and he was forced to make great concessions to foreign powers in order to borrow money abroad. At the same time Russia in Mongolia and Great Britain in Tibet were demanding recognition of their interests, and except for a shadowy form of suzerainty northern or Outer Mongolia and western or Outer Tibet were lost to China. The outbreak of the World War, in spite of Chinese proclamations of neutrality, involved the violation of Chinese territory, as the Japanese forced the Germans to surrender Kiao-chau. Throughout these troubles it became increasingly clear that China was a republic only in name, and that Yuan Shi Kai was practically an absolute ruler. Rumors of a return to monarchy were frequent, but early in November, 1915, it was officially announced that no immediate change in the government was contemplated in that year.

Yuan Shi Kai died in 1916, and was succeeded by Li Yuan-hung, who held office until July, 1917. He was followed by Feng Kwo-chang, who held office until superseded by President Hsu Shi-chang, elected in September, 1918. China joined the allies in the World War in July, 1917, and its envoys made a very good impression at the peace conference, which began its sessions in January, 1919. The Chinese Minister of Foreign Affairs, a member of the peace delegation, outlined his country's foreign policy as follows: China fully supported the liberal policies of the democratic nations and gave its sanction to the principle of the League of Nations, but steadfastly opposed the idea of granting further concessions to foreign powers. The Chinese hope gradually to bring about the return of all concessions granted in the past, and are desirous of reorganizing their country as an independent nation freed from outside influence. Japan's occupation of Shantung after the war aroused ill feeling in the United States, but the tension was allayed by the promise that the peninsula would later be restored to China.

Related Articles. Consult the following titles for additional information:

GEOGRAPHY

Altai Mountains	Kiao-chau
Amur (river)	Mekong River
Amoy	Mukden
Canton	Nanking
Fu-chow	Ning-po
Hang-chow	Peking
Hankow	Shanghai
Himalaya	Tien-tsin
Hoang-ho	Yalu River
Hong-kong	Yang-tse-kiang

HISTORY AND RELIGION

Boxer Rebellion	Great Wall of China
Buddhism	Li Hung Chang
Chinese Exclusion	Mohammedanism
Chinese Immigration	Taoism
Chinese-Japanese War	Yuan Shi Kai
Confucianism	World War

CHINA PAINTING, a form of art that has become very popular with amateurs in recent years, and has also proved a profitable vocation for professionals. China decorating was at the height of its vogue in America at the outbreak of the World War. That struggle disorganized the industry considerably, because it brought about difficulties in the way of importing certain lines of pottery not manufactured in the United States. One factor that encouraged the vogue of china painting was the popularity of the conventional design. Many of those who find pictorial work beyond their scope are able to get very pleasing results when they confine themselves to designs not requiring freehand drawing.

The equipment demanded in china decoration includes mineral paints, a medium for mixing with the colors to make them work smoothly, and various kinds of brushes. The bases of mineral paints are metals, and the paints are of such a nature that when the china is subjected to intense heat in the kiln the colors become an inseparable part of the material. They are marketed in the form of powder and as prepared paints, put up in tubes. Various substances are used for media, such as spirits of turpentine, clove oil, aniseed oil, etc.

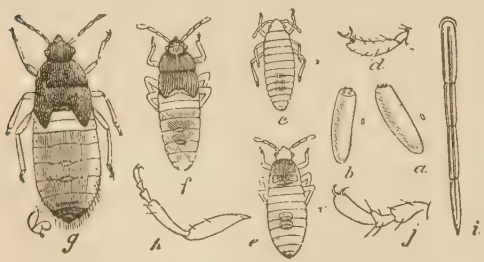
Before the actual painting is done, an outline must be sketched on the article to be decorated. In many cases the outline is transferred to the china by means of tracing paper. To one who is unskilled in freehand drawing this step of the process is

essential. As mineral paints are transparent, the strokes taken must be sure and accurate, and the working over that may be done with oils must be eliminated.

The firing of the decorated article is a very important part of the process, and requires both skill and experience. A model kiln in common use is made of metal and lined with firebrick. Kerosene, gas, gasoline and charcoal are used as fuels. The kiln is cooled off when the china takes on an ashy-red tint, and the latter is not removed until it has thoroughly cooled.

CHINCH BUG, the worst insect pest known to the wheat raiser. It is widely distributed, appears every year and in favorable seasons multiplies to such an enormous extent that it attacks all grains and most of the forage plants. Rarely is there any serious injury done during years when an abundance of rain falls, and often a period of wet weather quickly exterminates the insects for that year. The chinch bug is small and blackish and belongs to the same class with the squash bug. The female lays many eggs, each of which is cylindrical and squarely cut off at one end. The newly hatched insect looks much like the mature bug and is pale reddish in color, with a yellow band across the abdomen. The insects begin feeding at once, climbing the stem of the plants and keeping together in great masses, moving on whenever the food is exhausted. Two broods are raised in a year, and the number of insects appearing some seasons is beyond computation. They move sometimes a quarter of a mile or more at a time, crawling over the ground and feasting on whatever comes in their way. It is thought that $20,000,000 would not cover the annual damage of these bugs.

Adult, much enlarged.



CHINCH BUG

a, b, eggs; c, newly hatched larva; d, tarsus; e, larva after the first shedding of its skin; f, the same, after the second molting; g, the pupa; h, enlarged leg of the perfect bug; j, tarsus of the same, still more enlarged; i, beak.

Their spread can be prevented by making a barrier of tar around a field, or by digging holes, into which the insects fall and are destroyed, or, still better, by burning waste grass and refuse near the fields in the fall, as here the bugs hide during the winter.

CHINCHIL'LA, a South American animal very closely allied to the rabbits, which they resemble in the general shape of the body and in the fact that their hind legs are longer than their fore legs. One species,

CHINCHILLA

about fifteen inches long, is covered with a beautiful pearly-gray fur, which is of great value. The chinchilla lives in colonies in the mountains of most parts of South America, makes numerous and very deep burrows and feeds on roots and tough vegetable growths. It is of a gentle, sportive nature.

CHINESE IMMIGRATION. Among white people there is a distinct aversion to the presence of Chinamen in their midst in large numbers. In some communities the presence of even an occasional yellow man is resented. There are several reasons for this attitude:

(1) A Chinaman resists the "melting pot;" he will not conform to the customs of the country of his temporary residence.

(2) He emigrates to acquire money where it is more easily earned than at home, expecting to take it back to China within a few years.

(3) He will work for a wage which would mean literal starvation for white men. (This is the main indictment against him among laboring men.)

(4) Prejudice is strong against him because of stories generations old regarding habits

which are filthy from Anglo-Saxon standpoints—that he eats rats, for example. His strange clothing and his pigtail, not longer prescribed, excite derision and fan the prejudicial flames. That his diet of rats is a slander except when facing starvation does not favorably influence public opinion.

Soon after the year, 1875, there was a large increase in Chinese immigration to the United States; the Western states felt its economic effects so severely that in 1879 Congress passed a law aimed at restriction of Chinese immigration. President Hayes vetoed it, because it violated the Chinese-American treaty of 1868. The next year a new treaty gave the United States the right to regulate, limit or temporarily suspend the reception of Chinamen in the republic, but not the right absolutely to prohibit for all time such immigration. In 1882 it was suspended for ten years; in 1892 the suspension was extended another ten years, and Chinamen already in the United States were forced to secure certificates of residence. In 1892 the law was indefinitely extended—until further enactment should be made.

After the World War had been in progress two years, the shutting off of European immigration and the drafting of men into America's armies seriously affected labor conditions in all parts of the country. The supply of laborers was far below the demand. For a time it was thought probable that Chinamen would have to be invited to America in large numbers to fill the depleted ranks of common labor. The sudden ending of the war, however, relieved conditions.

There were nearly 72,000 Chinamen in the United States in 1910.

CHINESE-JAPANESE WAR, a war fought in 1894-1895 between China and Japan. It was caused by a dispute between the two powers concerning their conflicting interests in Korea (now Chosen). The war began in July, 1894, and ended on April 17, 1895, with the signing of the Treaty of Shimonoseki. Japan was the victor in the struggle. By the terms of the treaty, the island of Formosa and the Liaotung peninsula were ceded to Japan, and China agreed to pay an indemnity of about $150,000,000. Through the interference of the European powers Japan was forced to cede back Liaotung, with Port Arthur, to China, but the Japanese rewon it later through their war with Russia. In 1910 Korea was formally annexed to the mikado's realm, and renamed.

CHINOOK', the name of a warm, dry wind which blows over the Rocky Mountains in Montana and Wyoming and some of the Canadian provinces. It is supposed to have taken its name from the Chinook Indians, as the early settlers of this region thought that it came from the territory occupied by them. The chinook is caused by the descent of the current along the mountain slopes. As the air descends it becomes warmed by compression, and a descent of 5,000 feet will raise the temperature about 30°. Previous to its passing over the mountains the air has been robbed of its moisture, so that in its beginning the chinook is a dry wind and as its temperature is raised its capacity for moisture is increased; consequently, it melts the snow and clears the sky. The chinook occurs during the winter and early in the spring, and makes it possible for stock to graze in these regions during the entire winter. The hot winds of Kansas and Nebraska probably originate from a similar cause, and the wind in the Alps, known as the *Foehn,* is similar to the American chinook.

CHINOOK, the name of a tribe of Indians now extinct, but once strong and important in their home near the mouth of the Oregon. There they built large canoes and fished in the sea. Many words of their language are still in use in the *Chinook jargon,* a medley of English, French and Indian words that is the language of the traders among tribes farther north.

CHIPMUNK, the popular name in America for several small squirrels, but especially for the small, striped ground squirrel. This animal is about six inches long, reddish-brown in color, with black and white stripes along its back. It is a cheery, friendly little creature, so very curious that it will approach very close to a person and sometimes will even fearlessly explore the clothing. Its shrill notes of alarm often attract attention, when it would remain wholly unseen if it kept quiet. Its food consists of nuts and grains, which it stores up for winter use.

CHIP'PEWA. See OJIBWA.

CHIPPEWA FALLS, WIS., founded in 1838 and chartered as a city in 1870, is the county seat of Chippewa County, 105 miles east of Saint Paul, Minn., on the Chippewa

River, and on the Minneapolis, Saint Paul & Sault Ste. Marie, the Chicago & North Western and the Chicago, Milwaukee & Saint Paul railroads. The city has good water power and contains manufactures of lumber, wooden ware, flour, foundry products, beet sugar, shoes and other articles. The state home for feeble-minded and the county insane asylum are located here, and the city has a public library and a fine courthouse.. Population, 1910, 8,893; in 1917, 9,476 (Federal estimate).

CHIPPY, a small American sparrow, so called because its trilling notes sound like the syllables *chippy-chippy-chippy*. It is a gentle, friendly little creature, and is a destroyer of harmful insects. The bird has an ashy-blue breast and a chestnut cap. Its nest is made of grass and roots, and contains four or five eggs, which are blue, speckled with blackish-brown at the larger end. Two or three broods are raised by the parent birds in a season.

CHIROMANCY, *ki'ro man si.* See PALMISTRY.

CHIRON, *ki'ron*, the most famous of the Centaurs, a race fabled as half men, half horses. He lived at the foot of Mount Pelion, in Thessaly, and was celebrated through all Greece for his wisdom and for his skill in medicine and music. See CENTAUR.

CHIROPRACTIC, *ki ro prak'tik*, **HEALING**, a method of treating disease, introduced into the United States in 1895 by Dr. D. D. Palmer. It is based on the theory that vertebrae become displaced and cause pressure upon the nerves which pass to different parts of the body from the spinal cord, through the openings between vertebrae. This pressure, by interfering with the passing of nerve impulses, may be the cause of disease. In chiropractic treatment the doctor, by certain manipulations by hand, seeks to replace the displaced vertebrae and restore the patient to health. About 5,000 American physicians use this method, and the treatment is taught in a number of institutions.

CHIROPTERA, *ki rop'te ra*, an order of mammals which have more or less the power of flight. The most common example is the bat (which see). The fingers of the fore limbs are greatly elongated and carry, between these and the hind limbs and tail, a thin membrane which forms the wings. The bones are slender and filled with a light marrow; this lessens the animal's weight. The ears are often large in proportion to the size of the animal; its sense of hearing is remarkably acute.

CHITONS, *ki'tonz*, a large family of mollusks whose shells consist of many successive portions often in contact with, and overlapping, one another, but never truly joining. The shell in the typical chiton is composed of eight pieces, and the animal adheres to rocks or stones after the fashion of the limpet. The largest known are found along the California coast, and are eight or ten inches long.

CHIVALRY, *shiv'al ri*, a term which indicates strictly the organization of knighthood as it existed in the Middle Ages, and in a general sense the spirit and aims which distinguished the knights of those times. The education of a knight in the days of chivalry was as follows: When he was seven years of age he was sent to the court of some baron or noble knight, where he acquired skill in the use of arms, in riding and in attending on the ladies. When his age and experience in the use of arms had qualified him for war, he became an esquire or squire and accompanied his lord in battle. The third and highest rank of chivalry was that of knighthood, which was not conferred before the twenty-first year, except in the case of distinguished birth or great achievements warranting the highest public commendation.

The person to be knighted prepared himself by confessing, fasting and keeping vigil all night over his arms; religious rites were performed, and then, after promising to be faithful, to protect ladies and orphans, never to lie nor utter slander, to live in harmony with his equals and to protect the Church, he received the *accolade*, a slight blow on the neck with the flat of the sword from the person who *dubbed* him a knight. This was often done on the eve of battle, to stimulate the new knight to deeds of valor, or after the combat, to reward signal bravery. Though chivalry had its defects, chief among which, perhaps, was a tendency to certain affectations and exaggerations of sentiment, yet it tempered in a very beneficial manner the rudeness of feudal society. As a system of education for the nobles, it taught them the best ideals, social and moral, which the times could understand. (See illustration, with article FEUDALISM.)

CHLORAL, *klo'ral,* a colorless, oily liquid, commonly prescribed in the form of its hydrate. It is the poisonous principle in, "knock-out drops." The *hydrate of chloral,* as now prepared, is a white, crystalline substance, which in contact with alkalies, separates into chloroform and formic acid. Chloral kills by paralyzing the action of the heart. It is a hypnotic, as well as an anesthetic, and it is frequently substituted for morphia. It has been successfully used in delirium tremens, Saint Vitus's dance, poisoning by strychnia, lockjaw and some cases of asthma and whooping cough. It should be taken with great caution and under medical advice, as an extra dose may produce serious symptoms, and even death. In the treatment of poisoning by chloral, the person should be kept awake, his body warmed by friction or otherwise, and artificial respiration resorted to, if necessary.

CHLORATE, *klo'rate,* a salt formed by the combination of chloric acid with a base. Chlorates are decomposed by red heat, nearly all of them being converted into metallic chlorides with the evolution of pure oxygen. They burn so quickly with easily-burning substances that an explosion is produced by slight causes. The chlorates of sodium and potassium are used in medicine. The latter, in doses of from five to twenty grains, is largely used in scarlet fever and inflamed throat. It is also used in the manufacture of matches, fireworks, percussion caps and the like.

CHLORINE, *klo'rin,* or *klo'reen,* an elementary gaseous substance, discovered by Scheele in 1774. It was afterward proved by Davy to be a simple body, and was named from its peculiar greenish-yellow color, the word being derived from the Greek for *greenish-yellow.*

It is always found in nature in a state of combination. United with sodium it occurs very largely as the chloride of sodium, or common salt, from which it is liberated by the action of sulphuric acid and manganese dioxide. Chlorine is a very heavy gas, being about two and a half times as heavy as ordinary air; it has a peculiar smell, and when inhaled irritates the nostrils most violently, and also the windpipe and lungs.

During the World War chlorine-gas shells were among the most effective weapons used by the belligerents. Chlorine is not combustible, though it supports the combustion of many bodies. In combination with other elements it forms chlorides, which have most important parts in many manufacturing processes, as well as chlorates and chlorites. As it is a very powerful bleaching agent, in the manufacture of bleaching powder it is used in immense quantities. It is a valuable disinfectant where it can be conveniently applied, as in the form of chloride of lime.

CHLORITE SCHIST, *klo'rite shist,* a mineral of a grass-green color, opaque, and usually friable or easily pulverized. It is composed of little spangles, scales, prisms or shining small grains, consisting of silica, alumina, magnesia and protoxide of iron. It is closely allied in character to mica and talc. See MICA; TALC.

CHLOROFORM, *klo'ro form,* a colorless liquid used extensively to deaden the sense of pain. Chloroform has a sweetish taste and smell, having a flavor somewhat like that of the apple. It was discovered in 1831 by three chemists, Guthrie of America, Soubeiran of France, and Liebig of Germany, but its value as an anesthetic was made generally known in 1847 by Sir James Y. Simpson, of Edinburgh. For this purpose its vapor is inhaled. The inhalation of chloroform first produces slight intoxication; then, frequently, slight muscular contractions, unruliness and dreaming; then loss of voluntary motion and consciousness, the patient appearing as if sound asleep, and at last, if too much be given, death by coma and syncope. When skilfully administered in proper cases, it is considered one of the safest of anesthetics; but in its use certain precautions must be observed. Chloroform is a powerful solvent, dissolving resins, wax, iodine, strychnine and other substances. See ANESTHETIC.

CHLOROPHYLL, *klo'ro fil,* the green coloring matter of plants, which plays the most important part in plant life. It performs a function for plants similar to the function of the gastric juice in animals. It breaks up the carbonic acid gas taken in by the leaves, into two elements, returning the oxygen to the air and converting the carbon, with the water obtained from the roots, into starch. Starch can be formed by leaves only in the presence of light. Hence, leaves which are deprived of light, bleach or turn white. See BOTANY.

CHOATE, *chote,* JOSEPH HODGES (1832–1917), one of the greatest of America's

lawyers and an able diplomat, was born at Salem, Mass. He was educated at Harvard University and Law School, and settled in New York, where he gained the highest distinction as a lawyer, especially in the prosecution of the Tweed Ring and in the Income Tax Cases before the Supreme Court. He represented the United States in the Bering Sea controversy, and in 1899 he was nominated by President McKinley as ambassador to Great Britain. He served with rare ability until 1905, when he returned to his practice in New York.

JOSEPH H. CHOATE

CHOCOLATE, *chock'o late*, a paste composed of the kernels of the cacao tree, ground and combined with sugar and vanilla, cinnamon or other flavoring substance; also, a drink made by dissolving chocolate in boiling water or milk. The cocoa bean, from which chocolate is made, is the seed of a mushy pod, which is the fruit of the cacao, or cocoa tree (see CACAO).

The cocoa bean is about the size of a pecan nut. The kernel of the bean is called the *nib*, and from the nibs chocolate and cocoa are made. The beans are roasted for the purpose of making the shells brittle, so they will come off easily. When cooled, the beans are run through a machine, which removes the shells and leaves the nibs free and clean. The nibs are then ground to a thick paste. The ground chocolate is placed in kettles for more complete stirring; then, after having been transferred to tins, it is taken to the cooling room to harden into cakes, which are afterwards wrapped for shipment.

Chocolate for drinking purposes is made by dissolving chocolate in hot milk. It has a certain stimulating effect, and is far superior to tea or coffee as a food. Chocolate is rich in fat, and is wholesome and nutritious if eaten in moderate amounts.

CHOC'TAW, in former days the most advanced and one of the largest of the Indian tribes, living originally in the southern part of the United States, east of the Mississippi. De Soto met them in 1540 and fought with them a bloody and destructive battle. When the French came, the Choctaw immediately formed a friendship with them. Under United States rule they met with the fate of other tribes, and in 1837 they were removed to the Indian Territory, where they established their independent government, built churches, erected school buildings and under a well-established system of laws lived happily till their friendship with the South in the Rebellion lost for them a large portion of their lands. At the present time they form a prosperous and influential body of citizens in the state of Oklahoma. They number about 10,000 but are slowly decreasing. See FIVE CIVILIZED TRIBES.

CHOKE DAMP, a heavy gas found particularly in mines, so called because it extinguishes both plant and animal life. It is composed almost entirely of carbon dioxide, or carbonic acid gas (which see).

CHOLERA, *kol'er a*, a general name applied to several forms of intestinal trouble.

Asiatic Cholera is a contagious disease of the Far East, having its permanent seat in Lower Bengal. In former times it was one of the deadliest scourges of mankind, causing an appalling loss of life not only in Asia, but in Europe and even in America. As it is a disease that flourishes where filth prevails, it has been conquered by means of sanitation and hygiene. In the Philippine Islands it has been practically exterminated through the efforts of the American sanitation service, and is no longer a menace in any progressive country. Its early symptoms are slight fever, nausea, vomiting, headache, diarrhoea and prostration. Later the patient excretes a watery substance containing pieces of mucous membrane, and this stage is followed by collapse. Death or recovery marks the fourth or final stage of an attack. There is no specific drug known which will cure, but treatment is along hygienic lines.

Cholera Morbus, a painful but usually not a dangerous disease, caused in most cases by eating food containing harmful bacteria. It occurs usually in the summer, and may be brought on by overeating or by drinking too much ice water. Cramps, diarrhoea, vomiting and exhaustion are its symptoms. An attack is treated by purging the digestive tract and giving drugs to ease the pain. Total fasting for a number of hours is also required of the patient.

Cholera Infantum, an infantile disease responsible for a large number of deaths every summer among babies. It is caused by heat, bad sanitation and careless feeding, and is an

especial foe of babies fed from bottles and those reared in the poorer districts. The disease has three marked symptoms—excessive diarrhoea, fever and great weakness. Usually an attack starts with violent vomiting and bowel movements, but in some cases there is a preliminary spell of high temperature, diarrhoea and failing appetite. At first the child excretes milk curds and other bits of food, mingled with liquid waste, but the later stools are thin and colorless and leave a greenish stain. With the bowel movements occur persistent vomiting spells, and the patient continually grows thinner and weaker. In severe cases coma and convulsions may result at the end of eight or ten hours, followed by death, but milder attacks yield to treatment at the end of a few days. The first favorable sign is checking of vomiting.

Any baby showing indications of cholera infantum should be placed at once in the care of a good physician. Treatment consists of stomach washing, injections and the administration of such drugs as the physician prescribes. In hot weather the mother should be doubly careful about keeping the surroundings and body of the baby clean, and should protect the child from flies, impure food and all other disease breeders.

CHOPIN, *sho paN'*, Frederic Francois (1809–1849), a celebrated pianist and musical composer, of French extraction, born at Warsaw, Poland. He went to Paris in 1831, on account of the political troubles in Poland, and lived there many years.

As a pianist he attracted the attention of critics before he was twenty years old, and at the same age he had composed several mazurkas and nocturnes. These are still among the best extant, as he himself never excelled and rarely equaled his early powers. All of his works display a rare combination of poetic fancy and beauteous melody, and they abound in passages of the greatest difficulty, but are never harsh or strained. His *Funeral March* is probably the most impressive composition of its kind ever produced.

CHORD, *kord*, in music, the simultaneous sounding of different tones. The common *chord* consists of a fundamental note and the third and fifth notes in the scale beginning with the fundamental note. When the interval between the fundamental note and its third is two full tones, the combination is a *major chord;* when the interval is a tone and a half, the combination is termed a *minor chord;* when the intervals between the bass note and its third, and between the third and the fifth, are each a tone and a half, the chord is called *diminished.* The *tonic chord* is made up of the key note and its third and fifth; the *dominant chord* consists of the dominant, or fifth, of the scale, accompanied by its third and fifth; the *subdominant chord* consists of the subdominant, or fourth, of the scale, and its third and fifth.

CHOREA, *ko re'ah.* See Saint Vitus's Dance.

CHORUS, *ko'rus*, originally an ancient Greek term for a troop of singers and dancers, intended to heighten the pomp and solemnity of festivals. During the most flourishing period of ancient tragedy (500–400 B. C.), the Greek chorus was a troop of males and females, who, during the whole representation, never quitted the stage, in the intervals of the action chanting songs. In the beginning it consisted of a great number of persons, sometimes as many as fifty; but the number was afterward limited to fifteen.

In modern music the chorus is that part of a composite vocal performance which is executed by the whole body of singers, in distinction to the solo airs and passages for selected voices. The singers who join in the chorus are also called the chorus. The term is also applied to the refrain sung at the end of each stanza of a song.

A native costume

CHOSEN, *cho sen'*, a province of the Japanese Empire in Eastern Asia, known prior to 1910 as the kingdom of Korea. It is a peninsula extending southeasterly toward the Japanese islands between the Sea of Japan and the Yellow Sea. The area of the province is 84,103 square miles—about the same as that of Utah—and its population in 1916 was 16,913,224. When annexation occurred many Koreans moved westward into Chinese or Russian territory, but the Japanese who entered the new possession more than offset the loss in population.

The People. The native Koreans are supposed to have sprung from the intermarriage of Chinese, Ainos and other races, and are of Mongolian descent, but are taller, heavier and lighter-skinned than most Mongolians. Their features, too, are more regular than those of the typical Mongolian. Over 15,600,000 Koreans are found in Chosen, and more than 500,000 Japanese. Chinese are next in order, numbering over 180,000; of the other races the most numerous are the British, French and American, but these all told number fewer than 10,000.

The Koreans speak a language that is intermediate between Mongolo-Tartar and Japanese, and has many Chinese words. Their written language is a mixture of native and Chinese characters. In official correspondence Japanese is used, except in transactions among the native provincial officials. The people are very superstitious in their religious beliefs, and are ancestor and spirit worshipers. Christianity is making headway through the devoted efforts of missionaries, who have established churches, mission schools and hospitals.

Instruction. Before the annexation of Chosen by Japan, a knowledge of Confucianism and of the Chinese classics was considered necessary in the education of the upper classes, but modern ideas of education have become prevalent since Japanese occupation. The government provides elementary education for boys and girls alike, and many mission schools for them have been established throughout Chosen. A general Education Department supervises both the government and the mission schools. At Suigen a model farm and agricultural school have been established, and technical and industrial schools are gradually being founded. In 1915 there were in Chosen 404 public schools of various kinds, and 1,230 other schools. The primary schools numbered 285.

The Land. A mountain range extends the entire length of the kingdom along or near the northwest and the eastern shore, and this contains peaks varying in height from 4,000 to 8,000 feet. To the south and west the land slopes gently to the coast. The mountains are well wooded, as is most of the northern part of the country. The southern and western sections are covered with fertile soil, contain numerous streams and are in other ways well suited to agriculture. The climate in the north resembles that of China in the same latitude. The winters are somewhat severe and the summers warm. The climate of the southern part of the kingdom resembles that of Japan, being mild and equable. Everywhere there is sufficient rainfall for agricultural purposes.

Mining. The mineral resources include coal, found in the west-central part; gold, which is obtained along the rivers in the north; copper, lead ore, and granite, limestone and other building stones. Mining has not been extensively developed, but concessions have been granted to foreigners for exploiting the gold mines, most of which are in the hands of Americans. The most prosperous mines are at Unsan; these are managed by an American Company employing 2,000 workmen. The Japanese recently began working the gold mines. In the northern part of the country an anthracite coal mine is in operation.

Agriculture. The greater part of Chosen is well suited to farming, but the backwardness of the methods used and difficulties in the way of transportation have prevented full development of the country's resources. Improvement, however, is being made, and the outlook is promising. About 7,770,000 acres are under cultivation, about 1,080,000 of which are given over to rice, the most important food product. Wheat, millet, barley, soy beans, peas, red beans, cotton, tobacco, hemp and ginseng are also raised. The government is encouraging the development of the silkworm industry, as mulberry trees are numerous. Livestock, especially cattle, are raised as a by-product of agriculture.

Manufactures. The manufactures are limited and are at present confined to the weaving of fabrics from hemp and grass, the manufacture of coarse cotton and silk cloth, mats, bamboo screens, inlaid ware, tobacco goods, pottery and leather, and the manufacture of paper of a peculiar quality, used by the natives in making hats, other articles of clothing and umbrellas. Formerly the Koreans were noted for their skill in those arts which now are characteristic of the Chinese and Japanese, and it is supposed that these arts were introduced into Japan through Chosen.

Fisheries. Whale fishing is an important industry in the northern waters, and haddock, halibut, herring, sardines and other fish are caught in large numbers off the coasts. A Marine Products Association for the en-

couragement of the fishing industry has been formed, receiving an annual subsidy from the government.

Transportation and Communication. Roads throughout Chosen are for the most part very poor, though improvements are gradually being made. In the interior goods are transported by porters, oxen and pack animals, and by boat. The upper classes have been accustomed to traveling about by means of sedan chairs or on horseback, but railways are gradually being constructed. In 1917 there were 1,006 miles of track in the province. The railway system is connected with the Siberian and Chinese lines, and a modern through express makes triweekly trips from Fusan, on the southern coast, to Chang-chun, in Manchuria, by way of Seoul, the capital. From Chang-chun a train runs to Harbin, making connection with the Trans-Siberian Railway. In Seoul there is an electric railway which connects with points three miles outside the city. In 1917 there were 526 post offices in Chosen, and 1,994 miles of telegraph in operation. In the larger towns there is telephone service.

Commerce. There are twelve open ports in the province, and trade is carried on with Japan, China, the United States, Great Britain and Asiatic Russia. The chief imports include cotton goods, cotton yarn, machinery, silk goods, timber, kerosene, sugar, paper and coal; rice, beans, cowhides and cattle are exported.

Government. The chief executive official is a Japanese governor-general. He is assisted by heads of various departments, and by a central council composed chiefly of Koreans. The judicial, prison, tariff, land and railroad systems are under control of the Japanese government at Tokyo, but native officials administer for the most part the villages and districts.

History. According to tradition a Chinese statesman named Ki-tse founded a nation on the peninsula about 1100 B. C. In 108 B. C. the country became a part of the Chinese Empire, and a little over a century later it was divided into three principalities. About 960 one of these, called Kori, absorbed the others, and for the next 300 years the country (Kori, or Korea) existed as an independent nation. During this time the arts flourished, and Buddhism obtained a very strong hold upon the country. In 1392 Buddhism was overthrown by a revolution, a new dynasty was established, and the name Chosen, meaning *morning freshness*, was adopted.

Late in the sixteenth century the Japanese invaded the peninsula, but were finally driven out by aid of the Chinese. Chosen again became tributary to China, and was nominally so until 1895, the last year of the Chino-Japanese War. In 1897 the sovereign adopted the title emperor, and the independence of the kingdom of Korea was recognized by both China and Japan. The Japanese, however, gradually extended their influence over the country, and on August 23, 1910, it was formally annexed to the Japanese Empire. At this time the name Korea was abolished.

Related Articles. Consult the following titles for additional information:
Chinese-Japanese War Russo-Japanese War
Japan, subhead History Seoul

CHRIST (meaning *an anointed one*), a title of Jesus of Nazareth, now used almost as a name or as part of his name. See JESUS CHRIST.

CHRISTCHURCH, NEW ZEALAND, capital of the province of Canterbury and the see of the primate of New Zealand, situated on the Avon River, seven miles from the sea. Its port is Lyttelton. It contains a number of handsome buildings, among which are the provincial government offices, the cathedral, Saint Michael's Church, the supreme court and the town library. There are high class educational institutions, a fine park and a botanic garden. Population, 1911, 53,116.

CHRISTIAN IX (1818–1906), a highly respected king of Denmark, who succeeded to the throne in 1863. His family connections among the reigning houses of Europe were remarkable, and he was called the "father of the royal houses of Europe." His eldest daughter, Alexandra, was the wife of Edward VII of England; his second daughter, Dagmar, the mother of former Czar Nicholas II of Russia; his second son, George I, was king of Greece. His grandson became king of Norway in 1905 as Haakon VII.

CHRISTIAN X (1870–), king of Denmark, son of Frederick VIII and grandson of Christian IX. He succeeded to the throne on May 14, 1912, on the death of his father. He was not without experience in the affairs of the kingdom, for he had frequently been left in charge during his father's absence. He became a popular

sovereign, but never was obliged to meet a crisis until 1914, when the World War began. In December of that year a conference of the kings of Denmark, Norway and Sweden was held at Malmö, Sweden, at which the three sovereigns agreed to maintain strict neutrality throughout the war.

CHRISTIAN ENDEAVOR, The United Society of, an interdenominational religious organization of young people of the Protestant churches. The first society was organized by Rev. Francis Clark, D.D., at Portland, Maine, in 1881, and numbered about fifty members. In 1918 there were over 78,000 chapters, with a membership of over 4,000,000, representing eighty denominations. The principles upon which the society is founded are:

"Personal faith in Jesus Christ; loyalty to the individual church and to the denominational organization and loyalty to the universal church of Christ in every land."

The society has an interdenominational board of over 100 trustees, whose powers are simply advisory and who act as a bureau of information; it is in no sense a body of control. Every local society is entirely under the control of its own church and denomination.

CHRISTIAN ERA, the great era now almost universally employed in Christian countries for the computation of time, supposed to begin with the birth of Christ. The custom of reckoning time from the birth of Christ was introduced in the sixth century by a monk named Dionysius; but it is believed that in his computations he made a mistake of a few years, so that, according to the best authorities, Christ was born about four years before the beginning of our era. The practice of computing time from Christ's birth did not become general until the fifteenth century. The symbol used for dates of the Christian Era is A. D., standing for *Anno Domini,* or *in the year of our Lord.*

CHRISTIANIA, or **KRISTIANIA,** *krees-te ah'ne a,* Norway, the most important seaport and the capital of the kingdom, situated at the head of the long, narrow inlet called Christiania Fjord, about sixty miles from the Skagerrak, an arm of the North Sea. It consists of the city proper and a number of populous suburbs. Among the important buildings are the royal palace, the Parliament House, the governor's palace, a citadel, the great arsenal of the kingdom, a university, the Trinity Church and the cathedral. Attached to the university, the only one in Norway, opened in 1813, is a museum containing a fine collection of antiquities. The manufactures consist of woolen cloth, ironware, tobacco, paper, leather, soap, spirits and glass. The harbor is spacious and deep, and into it are brought half of the country's imports. Like the city of Washington, D. C., Christiania forms a separate official district.

CHRISTIAN'ITY, the religion instituted by Jesus Christ. It teaches that there is no salvation without Christ's atonement, without faith in God and a belief in the gospels. Though the great moral principles which it reveals and teaches and the main doctrines of the gospel have been preserved without interruption, the genius of the different nations and ages has materially colored its character. The first community of the followers of Jesus was formed at Jerusalem soon after the death of their Master. Another was formed at Antioch in Syria about A. D. 65, where the followers of Jesus were first called *Christians.* The travels of the apostles spread Christianity through the provinces of the Roman Empire, Palestine, Syria, Asia Minor, Greece, the islands of the Mediterranean, Italy and the northern coast of Africa, as early as the first century. At the end of the third century almost one-half of the inhabitants of the Roman Empire, and of several neighboring countries, professed this belief, and in the twentieth century it is still spreading through missionary work.

Many heretical branches sprang from the main trunk. From the Gnostics, who date from the days of the apostles, to the Nestorians of the fifth century, the number of sects was large, and some of them exist to the present day. The most important events in the subsequent history of Christianity are the separation of the Eastern and Western churches early in the eighth century, and the Western Reformation, which resulted in the establishment of Protestantism in the sixteenth century. The number of Christians now in the world is computed at 564,500,000.

CHRISTIANS. See Disciples of Christ.

CHRISTIAN SCIENCE, a religious system originated by Mary Baker Eddy, whose book, *Science and Health with Key to the Scriptures,* contains a complete statement of its teachings and practice. The church organization is known officially as the Church

of Christ, Scientist, and its members as Christian Scientists.

Christian Science is based upon the proposition that God is all in all, the only self-existent, infinite Being or Life, and that man in the image and likeness of God is spiritual and not material. This system of religious teaching differs from all others in its declaration that evil and matter are unreal and illusive, since God who is infinite Good and is Spirit, or Mind, cannot create, or be manifested in, anything unlike Himself. The truthfulness of this concept, it is declared, can be and is proved by actual demonstration of healing and regeneration through Christ as the universal spiritual ideal. Christ Jesus is regarded by Christian Scientists as the individual ideal of Truth.

The denomination has over 1,400 church organizations in the world. Large and beautiful church edifices have been erected and dedicated in Boston, New York, Chicago, Detroit, Los Angeles, London, England, and in many other cities. The Christian Science Church was founded by Mrs. Eddy in 1879 "to commemorate the word and works of our Master, which should reinstate primitive Christianity and its lost element of healing." In 1892 the Church was reorganized as the First Church of Christ, Scientist, in Boston, Massachusetts, known as The Mother Church. All Christian Science churches are branches of the Mother Church. Lesson-sermons compiled from the Bible and *Science and Health with Key to the Scriptures* are read at the Sunday services in these churches.

All Christian Science churches maintain free public reading rooms where those seeking information on the subject of Christian Science have access to the Bible, *Science and Health,* Mrs. Eddy's other works, and the periodical literature of the denomination. The Church periodicals include *The Christian Science Journal,* a monthly; *The Christian Science Sentinel,* a weekly; and *The Christian Science Monitor,* a daily newspaper. Over 5,000 authorized Christian Science practitioners are regularly devoting their time to the practice of Christian Science Mind healing. See EDDY, MARY BAKER.

Many people whose attitude toward Christian Science has been unfriendly prophesied that with the death of Mrs. Eddy, which occurred in 1910, the organization would begin to weaken. However, the passing of the leader had no such effect.

CHRISTMAS, *kris'mas,* the most important festival of the Christian Church, observed annually on December 25, in memory of the birth of Christ. The time when the festival was first observed is not known with certainty; but it is spoken of in the beginning of the third century by Clement of Alexandria, and in the latter part of the fourth century Chrysostom speaks of it as of great antiquity. As to the day on which it was celebrated, there was long considerable diversity, but by the time of Chrysostom the Western Church had fixed on December 25, though no certain knowledge of the day of Christ's birth existed; and the Eastern Church, which had favored January 6, gradually adopted the same date. The existence of heathen festivals celebrated on or about this day doubtless accounted in large measure for its selection; and Brumalia, a Roman festival held at the winter solstice, when the sun is, as it were, born anew, has often been mentioned as having a strong bearing on the question.

In the Roman Catholic, Greek, Anglican and Lutheran churches, there is a special religious service for Christmas day; and, contrary to the general rule, a Roman Catholic priest can celebrate three masses on this day. In homes in all Christian countries, Christmas is a day of household festivities, family reunions and joy for the children. The widespread practice of presenting gifts at Christmas time has probably some connection with the gifts presented to the Child Jesus by the three Wise Men. Within recent years many towns and cities have adopted the custom of setting up community Christmas trees in centrally located places, and holding public gatherings at which carols and hymns are sung.

CHRISTY, *kris'ti,* HOWARD CHANDLER (1873–), an American illustrator, best known as the originator of a definite and charming type of pictures of society girls. He was born in Morgan County, Ohio. In 1893 he went to New York, and soon afterward his work began to appear in magazines.

Christmas Programs

I

I heard the bells on Christmas Day
Their old, familiar carols play,
And wild and sweet
The words repeat
Of peace on earth, good-will to men!
—Longfellow.

Song, Little Children, Wake and Listen
—From Williamson's Children's Manual
The Story of the Wise Men.....
.....Matt. II, 1-12
Old Christmas.....Sir Walter Scott
Song, Silent Night, Holy Night
Scene from Little Women.....Alcott
The Hummels' Christmas Breakfast
Christmas Morning.....Edwin Waugh
Holly Drill by Girls.....Original
Song, The First Nowell.....Old Carol
A Visit from Santa Claus.....Moore
Christmas Day in Foreign Lands.....
.....Original
The Little Match Girl.....Andersen
Dialogue, Old Scrooge and His Nephew
(Adapted from Dickens' Christmas....
..... Carol)
The Spirit of Christmas To-day.....
.....Original Essay
Song, Once in Royal David's City....
.....Alexander

II

He comes in the night! He comes in the night!
He softly, silently comes;
While the little brown heads on the pillows so white
Are dreaming of bugles and drums.
He cuts through the snow like a ship through the foam,
While the white flakes around him whirl;
Who tells him I know not, but he findeth the home
Of each good little boy and girl.

Song, Away in a Manger.....Luther
The Story of the Shepherds.....
.....Luke II, 8-18
The Three Kings.....Longfellow
Christmas Quotations.....Selected
The Christmas Tide.....Sangster
Song, O Little Town of Bethlehem....
.....Brooks
Scene from Cricket on the Hearth....
.....Dickens
The Party at Caleb Plummer's
Christmas .....Tennyson
Debate, Should Children be Taught the Santa Claus Myth?
Song, What Child is This?....Old Carol
Legend of Saint Christopher...Adapted
Jest 'Fore Christmas.....Field
Community Christmas Celebrations..
.....Original Essay
Song, God Rest Ye, Merry Gentlemen.
.....Old Carol

During the Spanish-American War Christy went to Cuba, and furnished articles and illustrations for *Scribner's Magazine, Harper's Magazine* and *Collier's Weekly.* He illustrated many works of fiction, and each year for several years produced pictures in color for a gift-book edition of some one of Riley's poems.

CHROMATIC, *kro mat'ik,* in music, a term applied to notes and peculiarities not belonging to the diatonic, or standard, scale. Thus, a *chromatic chord* is a chord which contains a note or notes foreign to the diatonic scale; *chromatic harmony,* harmony consisting of chromatic chords. The *chromatic scale* is a scale made up of thirteen successive semitones, that is, the eight diatonic tones and the five inserted intermediate tones. See MUSIC.

CHROMITE, *kro'mite,* or **CHRO'MIC IRON ORE,** a compound of iron, chromium and magnesia of black or brownish-black color. Chromite is the most important source of chromium, and it is also extensively used in the manufacture of paints and in the dyeing of cotton goods. It is found chiefly in Canada, New Zealand, Australia, Russia and Turkey. See CHROMIUM.

CHROMIUM, *kro'mi um,* a metal which forms very hard steel-gray masses. It never occurs free, but may be obtained from chromite (which see). In its highest degree of oxidation it forms a compound of ruby-red color. In the pure state it has no practical applications. It takes its name from the various and beautiful colors which its oxide and acid communicate to minerals into whose composition they enter. It is the coloring matter of the emerald and beryl. Chromium is employed to give a fine, deep green to the enamel of porcelain and to glass. The oxide of chromium is of a bright grass-green or pale yellow color. This element was originally discovered in 1797 by Vanquelin, in the native chromate of lead of Siberia.

CHRONICLES, *kron'e klz,* BOOKS OF (acts of the days), two books of the Old Testament, which formed only one book in the Hebrew canon, in which it is placed last. Its division into two parts is the work of the Seventy, who gave it the title *Paraleipomena,* meaning *things omitted.* The name *Chronicles* was given to it by Jerome. The book is one of the latest compositions of the Old Testament and is supposed to have been written by the same hand as *Ezra* and *Nehe-*

miah. According to its contents the book forms three great parts: 1, genealogical tables; 2, the history of the reigns of David and Solomon; 3, the history of the kingdom of Judah from the separation under Rehoboam to the Babylonian captivity, with a notice in the last two verses of the permission granted by Cyrus to the exiles to return home and rebuild their temple.

CHRONOLOGY, *kro nol'o ji,* the science which treats of time, and has for its object the arrangement and exhibition of historical events in order of time, and the ascertaining of the intervals between them. Its basis is necessarily the method of measuring or computing time by regular divisions or periods, according to the revolutions of the earth or moon. The motions of these bodies produce the natural division of time into years, months and days.

As there can be no exact computation of time or placing of events without a fixed point from which to start, dates are fixed from an arbitrary point, or *epoch,* which forms the beginning of an *era.* Thus, the epoch almost universally in use to-day, as the point from which all events are dated, is the birth of Christ. The letters B. C. and A. D. (*Anno Domini,* in the year of our Lord) are used to designate respectively dates before and after the birth of Christ. Among the Greeks time was reckoned by Olympiads, the four-year intervals between successive games, and the beginning of their era was approximately 776 B. C. The Romans calculated from the time of the founding of Rome, 753 B. C., and the Mohammedans from the flight of Mohammed (see HEGIRA).

CHRONOMETER, *kro nom'e ter,* an instrument for measuring time, the name not applied, however, to the ordinary watch or clock. It is a portable timepiece, intended to mark time with great accuracy, and made to beat at half-second intervals. Chronometers are used in astronomical observations and in determining longitudes at sea.

CHRYSALIS, *kris'a lis,* an intermediate form which butterflies assume after they cease to be larvae and before they reach their winged, or perfect, state. While in the chrysalid state, the animal is resting in apparent insensibility, entirely without food, though it continues to breathe. The chrysalis in most cases is protected from observation by its color, which closely resembles the object to which it is attached. In the case of moths the larva weaves around itself a cocoon, in which the change to the pupa stage takes place. See BUTTERFLY.

CHRYSANTHEMUM, *kris an'the mum,* a group of plants resembling the asters, comprising herbs and shrubs, and bearing large heads of flowers on the ends of the stems or branches. Two species are common weeds in Great Britain: the *ox-eye daisy,* a meadow plant with white ray flowers, and the *corn marigold,* a weed with golden-yellow ray flowers. The former has been introduced and become common in the United States. The gorgeous chrysanthemums of the gardens are varieties of Chinese and Japanese plants. These are extensively cultivated in the hothouses of most countries and are remarkable for the great variety of form and the brilliancy of color which they show during the period of their autumn blooming. The chrysanthemum is the national flower of Japan, and the open variety with sixteen ray flowers is the imperial emblem.

CHRYSOBERYL, *kris'o burl,* a variety of beryl that occurs in six-sided crystals which are sometimes compressed. It contains considerable alumina, has a glassy luster and is of various shades of green. Occasional specimens appear red when held between the eye and the light. One variety forms the gem called *cat's-eye,* and other varieties suitable for gems are occasionally found, but most specimens are of inferior quality. Chrysoberyl was known to the ancients as oriental topaz and oriental chrysolite. It is found in Ceylon, the Ural Mountains and Brazil, and in the United States at Haddam, Conn., and at various localities in Maine.

CHRYSOLITE, *kris'o lite,* a mineral composed of silica, magnesium and iron. Its prevailing color is some shade of green. It is harder than glass, but is less hard than quartz; it is often transparent, sometimes only translucent. Very fine specimens are found in Egypt and Brazil, and it occurs in large quantities in Macon County, North Carolina. Gem varieties are known as *olivin* and *peridot.*

CHRYSOPRASE, *kris'o praze,* a stone found in small quantities in Germany and some parts of America, formerly much prized as a gem. It is apple-green in color, but under the influence of heat it loses its brilliance and is therefore not much used. It is mentioned in the Bible, and was probably known to the ancients.

CHUB, a river fish of the carp family, also known as *dace.* The body is oblong, nearly round, and the head is broad. The head and back are green, the sides are silvery and the belly is white. This fish frequents deep holes in rivers shaded by trees, but in warm weather floats near the surface and furnishes sport for anglers. It is of little account as food and rarely attains the weight of five pounds. See DACE.

CHURCH, a word which in its widest sense denotes the whole community of Christians and was thus used by the New Testament writers. In a more restricted meaning, it denotes a particular section of the Christian community, differing in doctrinal matters from the remainder, as the Roman Catholic Church, the Protestant Church, or the leading church of a nation, as the English, Scotch or French Church. In yet another sense, it signifies an edifice appropriated to Christian worship. After the conversion of Constantine, the basilicas or public halls and courts of judicature and some of the heathen temples were consecrated as Christian churches. When churches came to be specially built for Christian worship, the forms were various, but later the form with the cross aisle or transept became common. Churches are classed as *cathedral,* when containing a bishop's throne; *collegiate,* when served by a dean and chapter; *conventual* or *minster,* when connected with a convent or monastery; *abbey* or *priory,* when under an abbot or prior, and *parochial,* when the charge of a secular priest.

CHURCH, FREDERICK EDWIN (1826–1900), an American artist born in Hartford, Conn. He went to New York and in 1849 was elected a member of the National Academy. In 1853–1857 he traveled in South America. Later he went on an expedition to the coast of Labrador and on his return painted his great picture, *Icebergs.* Church traveled through the West Indies, Europe and Palestine in 1866. His best work was the *Great Fall at Niagara;* other works are *Damascus, Jerusalem* and *The Parthenon.* His pictures are mostly pictorial, and they abound in details, to a fault, but they show care and skill.

CHURCHILL, WINSTON (1871–), an American novelist whose books, dealing with purely American subjects, are often counted among the "best sellers." He was born in Saint Louis and educated at the United States Naval Academy at Annapolis. Churchill was for a time editor of the *Army and Navy Journal,* and in 1895 he became managing editor of the *Cosmopolitan Magazine.* After contributing short stories to leading magazines, he gained wide popularity through his trilogy of historical novels, *Richard Carvel, The Crisis* and *The Crossing.* In *Mr. Crewe's Career* and in *Coniston* he portrayed contemporary political life in New England, and in *The Inside of the Cup* he dealt with the relation of religion to social problems. In 1917 appeared *Dwelling Place of Light.*

WINSTON CHURCHILL

CHURCHILL, WINSTON LEONARD SPENCER (1874–), an English statesman, soldier and author, son of the late Lord Randolph Churchill. He entered the army in 1895 and served in India, and then in Egypt. He took part in the Battle of Khartum where he won a medal for gallant conduct. After serving during the Boer War as correspondent for the London *Morning Post,* he was elected to the House of Commons in 1900 as a Conservative. Having become a member of the Liberal party, he was appointed Under Secretary of State for the Colonies, holding that office from 1905 to 1907. From 1908 to 1910 he was President of the Board of Trade; from 1910 to 1912, Home Secretary; in 1912 he was appointed First Lord of the Admiralty in the Asquith Ministry, being one of the youngest men who ever held that post. In 1913 Churchill made his sensational proposal to Germany in regard to a "naval holiday." His plan was to have England and Germany cease from adding to their respective navies for one year, but before any action was decided upon all such plans were overturned by the outbreak of the World war.

Churchill threw himself wholeheartedly into the struggle, but his conduct of naval affairs was much criticized, and in 1915 he was relieved of his office. For a brief period he held the unimportant position of Chancellor of the Duchy of Lancaster, but England later recognized its need of a man of his ability, and in 1917, when the Lloyd George Cabinet was reorganized, Churchill

was appointed Minister of Munitions. In 1918 he aided in settling a serious strike in the munitions industries.

Churchill was reëlected to Parliament in the general election of December, 1918, and when the new Cabinet was organized in January, 1919, he was made Secretary of the War Department, with which was combined the Air Ministry. He has written *The River War, London to Ladysmith via Pretoria, My African Journey* and a biography of his father.

CHURCHILL RIVER, the longest river of Manitoba and the most important stream which enters Hudson Bay. It rises in Western Manitoba, in La Crosse Lake, forms or passes through various lakes or lakelike expansions, the largest being Big or Indian Lake, and enters Hudson Bay after a northeasterly course of about 925 miles. Fort Churchill is at its mouth.

CHURCH OF ENGLAND. See ENGLAND, CHURCH OF.

CHURN, a vessel used for making butter. The oldest and simplest pattern consisted of a vessel shaped like the lower part of a cone and having a circular hole in the center of the cover. The cream was stirred about by the use of one or more small pieces of board containing a number of perforations and attached to a vertical handle, which extended through the opening in the cover. By working this handle up and down the motion was given to the cream or milk. Churns of a later pattern are now in general use and these secure the desired result by rotary motion. In creameries large churns operated by power are in use. See BUTTER; CREAMERY.

CHURUBUSCO, *choo roo boos'ko,* BATTLE OF, a battle of the Mexican War (which see), fought near the city of Mexico, August 20, 1847, between 18,000 Americans under General Taylor and 25,000 Mexicans under Santa Anna. The fighting was severe throughout one day, the Americans being at one time threatened with defeat, but a determined counter-attack won an advantageous position, from which the Americans compelled the surrender of the fortress. The Mexicans retreated to the City of Mexico.

CHYLE, *kile,* an opaque, milky fluid, found in the small intestine during digestion. It is formed by the action of the intestinal juices, bile and pancreatic juice, on chyme. These juices, being alkaline in character, neutralize the acidity of the gastric juice. Chyle contains the nutritive portion of the food, which is absorbed by the villi of the intestines and carried by the lacteals of the thoracic duct.

Related Articles. Consult the following titles for additional information:
Chyle, Lacteals, Thoracic Duct, Digestion, Lymph, Stomach

CHYME, *kime,* a thick grayish-white substance formed by the action of gastric juice on food in the stomach. The walls of the stomach contract in such a way as to churn the masticated food and mix it thoroughly with the gastric juice, and the resulting chyme passes into the small intestine to be changed into a fluid called chyle (which see).

CICADA, *si kay'da,* more commonly called LOCUST and HARVEST FLY, a large insect, in size varying in spread of wings from one inch to four inches. Doubtless the cicadas (Latin, *cicadidae*) are the noisiest insects in the world, but only the males can be charged with disturbing the peace; the females are silent. The males have a long, shrill note, produced by vibrating membranes of special sound organs located on the under side of the abdomen.

CICADA

The females lay their eggs in the twigs of trees or shrubs, from which the young drop to the ground soon after they are hatched. The long life they live underground is not well understood, but finally the pupa crawls out upon the trunk of a tree or a spear of grass, its skin splits open along the back, and the full-grown insect emerges. At first the wings are merely watery sacs, but in a very short time they expand to their full size. The most remarkable of the cicadas, and according to the United States Department of Agriculture "the most interesting insect in the world," is the so-called *seventeen-year locust,* whose larvae spend either thirteen or seventeen years under ground, lacking a few weeks, in slow development. Then millions of individuals attain maturity almost at the same moment and emerge for a noisy and strenuous existence above ground, terminating in exhaustion and death after about five weeks. During that period the females lay their eggs by chiseling grooves in the small branches of trees. The larvae reach the

ground and in the soil disappear for their long sleep.

During their short life above ground, during the months of May and June, they have been known to do incalculable damage to crops, often destroying with remarkable completeness all growing grain in their pathway. In 1919 both the nineteen-year and the seventeen-year variety were expected to visit the United States; the two varieties were to overlap in certain parts of Tennessee, North Carolina, South Carolina, Georgia and Alabama.

CICELY, *sis'e ly*, a popular name applied to several plants of the parsley family. Sweet cicely, or sweet chervil, is a plant common in Great Britain and other parts of Europe. It was formerly used in medicine, and in some parts of Europe, particularly Germany, it is used in soups. A species of sweet cicely is found in American woods from Canada to Virginia.

CICERO, *sis'e ro* (106–43 B. C.), the greatest orator among the Romans, who lived in the stirring period of the declining republic. At one time hailed as the "savior of Rome," his eloquence later caused his banishment and finally his death by beheading.

His father was a friend of some of the leading public men, and Cicero was assisted to the best education available. At the age of twenty-five he came forward as a pleader, and he soon won a most favorable reputation. In 79 B. C. he visited Greece and profited by the instruction of the masters of oratory. He also made a tour in Asia Minor and remained some time at Rhodes, where he visited the most distinguished orators and took part in their exercises.

On his return to Rome his eloquence proved the value of his Greek instruction, and he became one of the most distinguished orators in the forum. In 76 he was appointed quaestor of Sicily, and he behaved with such justice that the Sicilians gratefully remembered him and requested that he conduct their suit against their governor, Verres. He appeared against this powerful robber, and although only two of the seven Verrine orations were delivered, Verres went into voluntary exile. After this suit Cicero rose rapidly in public life, becoming consul in the year 63. It was then that he succeeded in defeating the conspiracy of Cataline, after whose fall he received greater honors than had ever before been bestowed upon a Roman citizen. He was hailed as the father of his country, and thanksgivings in his name were voted to the gods.

But Cicero's fortune had reached the culminating point. The conspirators who had been executed had not been sentenced according to law, and Cicero, as chief magistrate, was responsible for the irregularity. Publius Clodius, the tribune of the people, raised such a storm against him that he was obliged to go into exile. On the fall of the Clodian faction he was recalled to Rome, but he never succeeded in regaining the influence he had once possessed.

In 52 B. C. he became proconsul of Cilicia, a province which he administered with eminent success. As soon as his term of office had expired he returned to Rome, which was threatened with serious disturbances, owing to the rupture between Caesar and Pompey. He espoused the cause of Pompey, but after the Battle of Pharsalia he made his peace with Caesar, with whom he continued to all appearance friendly and by whom he was kindly treated.

After the assassination of Caesar he hoped to regain his political influence. He allied himself with Octavianus and composed those admirable orations against Antony which are known as *Philippics* (after the speeches of Demosthenes against Philip of Macedon). Octavianus professed to entertain the most friendly feeling toward him, but when he had possessed himself of the consulate and formed an alliance with Antony and Lepidus, Cicero was proscribed. In endeavoring to escape from Tusculum, where he was living when the news of the proscription arrived, he was overtaken and beheaded by a party of soldiers.

Cicero's eloquence has always remained a model. After the revival of learning he was the most admired of the ancient writers, and the purity and elegance of his style will always place his works in the first rank of Roman classics. Students of Latin in high schools read Cicero in the third year of the Latin course. See ROME, subhead *History*.

CID, *sid*, THE, a name applied to Ruy or Rodrigo Diaz, count of Bivar (1026?–1099), the national hero of Spain. He distinguished himself by his exploits in the reigns of Ferdinand, Sancho and Alfonso VI of Leon and Castile. His life appears to have been entirely spent in fierce warfare with the Moors, then masters of a great part of

Spain. His sword, banner and drinking cup are supposed still to be in existence and are greatly reverenced by the Spanish people. Numerous romances in which history was mingled with the wildest fables were written about him during the sixteenth and seventeenth centuries, and he is the hero of a famous tragedy (*Le Cid*) by Corneille.

CIDER, *si'dur,* a liquor made from the juice of apples. The apples are ground and crushed until they are reduced to a pulp; the juice is allowed to run into casks, where it is freely exposed to the air until partial fermentation takes place, when a clear liquor of a pale brown or amber color is the result. Unfermented cider is extensively used as a beverage, and it is also boiled to the consistency of sirup and used in cooking.

CIENFUEGOS, *the ain fwa'gose,* the second city of Cuba in size, a seaport on the southern coast, 130 miles southeast of Havana, with which it is connected by railway. It has a safe and capacious harbor on the Bay of Jagua. It is among the finest towns of Cuba and exports sugar, wax and timber to the value of over $5,000,000 annually. Population, 1915, 81,502.

CIGAR, *si gahr',* several leaves of tobacco, tightly rolled into cylindrical form and tapered at one or both ends, and used for smoking. The outside leaf, or wrapper, is usually of finer quality than the leaves inside. The best cigars are made of Cuban tobacco called Havana, because brought from that port. Governments derive large sums of internal revenue from the manufacture and sale of cigars and other tobacco products. In the United States the war tax law of 1917 placed a tax on cigars ranging from $1 to $7 per thousand.

See Tobacco, for various kinds, processes of growing, and manufacture.

CIGARETTE, *si gahr et',* a small cylindrical roll of tobacco, encased in a paper wrapper, used for smoking. While the use of tobacco in any form is decried by many authorities, practically all specialists on health agree that while cigars and pipes in strict moderation are not necessarily harmful to adults, the cigarette habit is dangerous to growing boys. The combustion of paper and tobacco gives rise to poisonous properties, and pieces of the fragile paper and bits of the tobacco at the exposed end of the cigarette get into the mouth and thus into the inner organs, adding another danger.

Tests of boys who smoke cigarettes and of those who are not addicted to them show on the part of non-smokers more alertness, greater endurance and better health. These facts proven, a strong crusade is being conducted against the cigarette habit. The Anti-Cigarette League of America publishes the following course of treatment for those who may desire to be released from the desire to smoke cigarettes:

(a) Six ounces of silver nitrate solution (one-fourth of one per cent). Use as a mouth wash after every meal, for one week, if necessary. Do not swallow any of the solution. Keep it in a colored bottle. The cost should not exceed twenty-five cents.

(b) Gentian root (not the powder) should be chewed between meals. It is slightly tonic, is an aid to digestion and may be used for several weeks without injury.

The diet for the first two weeks consists exclusively of fruits, well-baked cereal foods and milk. The best cereal foods are Shredded Wheat Biscuits, Corn Flakes, Puffed Rice, Puffed Wheat, etc., used with cream and milk. Whole wheat or rye bread, etc., may also be used. The moderate use of nuts, well masticated, is of value. Eggs and cottage cheese may also be used. At the close of each meal use fresh sub-acid fruits, as peaches, pears, apples, pineapples, etc. Sweet milk, buttermilk, or salted milk may be used in place of tea or coffee.

While irritating and stimulating foods and drinks intensify the craving for tobacco, a grain, milk and fruit diet lessens it. In some special cases an entire milk diet for a few days may be beneficial; especially if there exists an irritable stomach bordering on ulceration, with an excess of hydrochloric acid. Where the digestion is slow, and there is a deficiency or absence of free hydrochloric acid, a diet composed entirely of fresh fruits for a day or two preceding the grain, fruit and milk diet may be of benefit.

Eliminative baths, preferably the Turkish bath, will assist in rapidly getting rid of the stored-up nicotine.

As a rule, it takes from three to six weeks to eliminate entirely the desire for tobacco. The time required depends upon how closely the directions are followed. Still more complete directions for dealing with the habit may be secured by addressing the Anti-Cigarette League of America, Chicago, Ill.

See Anti-Cigarette League.

When the American armies were sent to Europe in the World War the soldiers clamored for cigarettes; the demand from that source stimulated sales among those who remained at home, and it was admitted that instead of decreasing, the evil was in a fair way to become fastened more strongly than ever upon the country.

Governments derive large revenue from the manufacture of cigarettes. During the World War the United States raised the internal revenue tax on cigarettes to $3 per thousand for the better grades; the tax in Canada ranged from $2.40 to $7.00 per thousand.

CILIA, *sil'e a*, small, generally microscopic, hairlike projections found on the inner surface of some organs of the body. They are found in the nasal passages, except where the olfactory nerve is distributed, on the upper surface of the soft palate, in the Eustachian tube and the tympanum, in the larynx, except over the vocal cords, and in every tiny division of the bronchi. These cilia have a constant rapid motion, which produces a continuous current always in the same direction on the same surface. See BRONCHI; LUNGS.

CIMBRI, *sim'bre*, a tribe of ancient Europe, the origin of which is involved in obscurity. The Cimbri were the first of the Germanic tribes to force their way into Roman territory. Caesar defeated them.

CINCHONA, *sin ko'na*, an important genus of plants belonging to the madder family. They are trees, shrubs or herbaceous plants, with simple, opposite leaves. The fruit is dry. The plants are found almost

CINCHONA

exclusively in the tropics, and many of the species are of great medicinal importance; from one of them quinine is produced. The bark is taken off in strips, longitudinally; it is in time renewed by natural growth. Cinchona plants have been taken from Peru, their native home, and they are now cultivated in large plantations in Ceylon, India, Java and other tropical countries. The name *cinchona* was derived from that of the Countess del Chinchón, wife of the viceroy of Peru at the time the value of the plant was discovered. See QUININE; PERUVIAN BARK.

Tyler-Davidson Monument

CINCINNATI, *sin sin nat'i*, OHIO, the county seat of Hamilton County and the largest city on the Ohio River below Pittsburgh. Until a few years after 1890 it was the largest city in the state; in 1890 it had a population of 296,908, and Cleveland in the same year had 261,353. In 1900 Cincinnati had 325,902; Cleveland had forged ahead, with 381,768. The 1910 census gave Cincinnati 363,591 people, and a Federal estimate in 1917 credited it with 414,248. The city is 263 miles southwest of Cleveland, and 270 miles southeast of Chicago. New York City is 764 miles northeast.

Cincinnati lies along the north bank of the Ohio River, opposite the mouth of Licking River; the low land near the water gradually slopes upward for a short distance; there is then a large area of level ground, upon which the business section is built; back of this to the north rise hills of beauty, where the people have built thousands of fine homes. Low water mark at the river is 432 feet above sea level; the hills rise from 420 feet to 525 feet above this low water level.

Commerce and Transportation. Cincinnati has eight railroads of importance. Into one union station near the river converges the passenger traffic of the Cleveland, Cincinnati, Chicago & Saint Louis, the Chesapeake & Ohio, the Queen & Crescent, the Baltimore & Ohio and the Louisville & Nashville. The principal lines having separate stations are the Pennsylvania Lines, the Cincinnati, Hamilton & Dayton and the Cincinnati Southern. The latter road, 338 miles in length and operated under lease into the South by the Queen & Crescent line, is owned by the city.

The Miami & Erie Canal, 274 miles in length, extending from Cincinnati to Toledo, was built at a cost of over $8,000,000. It was an influential factor in the development of the city in a past decade, as it made a trade thoroughfare from the Ohio River to Lake Erie. The advent of many railroads has decreased its importance. The Ohio River is a great avenue of commerce; boats ply between Cincinnati and all important river ports.

There are more than 2,200 industrial establishments in the city and suburbs, which produce manufactures to the value of nearly $4,000,000 every week. Almost every article known to trade is made, and Cincinnati also has industries found in few other cities. In this latter class is the famous Rookwood pottery works in the northwestern part of the town. The best-advertised soap made in America is a Cincinnati product; the leading playing-card factory in the world is here, as is the main factory of the greatest sectional bookcase company.

Streets and Buildings. Cincinnati boasts the tallest building between New York City and Seattle, in a 34-story insurance structure, visible for miles in all directions. The Federal building, erected at a cost of $5,000,000, is the location of the post office, custom house, Federal courts and United States officials for the local district. The largest city hospital in the country was built here in 1914 at a cost of $4,000,000. Other city buildings of note are the city workhouse, containing 700 cells, the city hall, tuberculosis and contagious disease hospitals, and the House of Refuge for wayward boys and girls.

Many fine hotels have been built in recent years, and the city is well supplied with clubs. Of churches, the most pretentious is probably Saint Peter's Roman Catholic Cathedral, with a spire 224 feet high. Saint Paul's Methodist Church, two Presbyterian churches, and the Jewish Synagogue are notable buildings.

The intersection of Fifth and Vine streets may be considered as being in the heart of the retail business section. The city hall is six blocks north and west; the post office is one block east. The finest public work of art in the city is the Tyler-Davidson Fountain, in Fountain Square. This is of bronze and was cast in the royal foundry of Munich at a cost of $200,000. The city also has an equestrian statue of President William Henry Harrison and statues of Garfield and Lincoln, and in Spring Grove Cemetery is a magnificent bronze statue erected in memory of the soldiers who fell in the Civil War.

Bridges. There is a large suspension bridge between the city and Covington, on the Kentucky side of the river, built in 1867 at a cost of $1,800,000 and reconstructed in part just before 1900 at a cost of $500,000. It is 2,763 feet long, is 106 feet above low-water mark, and has a central span of 1,057 feet. Two iron bridges connect the city with Newport, Ky., which lies along the river east of Covington; one is called Central bridge, and across the other runs the Louisville & Nashville Railroad, The Chesapeake & Ohio and the Cincinnati Southern cross into Kentucky on bridges west of the Suspension bridge.

The Park System. Much attention has been given to the adornment of the city by developing the existing park system. In 1907 a comprehensive plan for parks was adopted, new areas were purchased and parked, and now Cincinnati has over 2,000 acres in public parks. The largest is Mount Airy Forest, 800 acres; Ault Park has 172 acres; Blackly Farm, 114; Bloody Run Parkway, 84; Mount Storm, 67; Mount Echo, 51, and Parker's Woods, 32 acres There are others smaller in area.

Education and the Arts. Cincinnati is one of the few cities of the world that offers education under municipal control from the kindergarten through the university. The University of Cincinnati (see CINCINNATI, UNIVERSITY OF) is owned by the city; its buildings are in Burnett's Woods. One of the foremost Jewish institutions in the United States is Hebrew Union College; the Roman Catholics have two important schools in Saint Joseph's and Saint Xavier's colleges. The Mechanic's Institute is a strong technical institution. The women of the city founded the Art Museum and Art School, which has now three large buildings. There are numerous libraries scattered about the city. The Museum of Natural History has a remarkable collection of relics of the Mound Builders (which see).

Historical. The site of the city of Cincinnati was first visited by George Rogers Clark in 1780; the first settlement was made in 1788, and the following year Fort Washington was built. In 1790 Hamilton County was organized, and Cincinnati became the

county seat. At this time it was given its present name by General Saint Clair, in honor of the Society of the Cincinnati (See CINCINNATI, SOCIETY OF THE). In 1802 it was incorporated as a town, and in 1819 it was organized into a city. The city continued to increase in importance and population until the Civil War. Because of its intimate relation to the business interests of the South, the city as a whole was opposed to the anti-slavery movement, but at the breaking out of the war it stood firmly by the Federal Government. In 1862 it was for a time under martial law. The city has suffered from frequent floods, which have caused much damage in the portion of the town next the river. The last flood was in 1913. In 1884 it was greatly disturbed by a riot, caused largely by the lax administration of justice. In 1911 the movable Fernbank Dam, the largest in the world at the time, was completed; it is adding much to the commercial importance of the city.

CINCINNATI, SOCIETY OF THE, a patriotic society organized by George Washington and his officers in the Continental army, while at Fishkill, on the Hudson River, May 13, 1783. Membership in the society was accorded to all Continental officers who had served three years or who had been honorably discharged, and also to the eldest male descendants of such officers. The society had thirteen branches, one in each of the original thirteen commonwealths, and its first meeting was held at Philadelphia in May, 1784. Washington was the first president of the society; Alexander Hamilton, the second. Owing to serious opposition to the purposes and methods of the organization, which were believed by many persons to be subversive of the principles of democracy upon which the new republic was organized, the Society of the Cincinnati soon declined in influence, and for many years after about 1830 it was practically dormant. In 1893, however, a revival began, and by 1902 all the old state societies were active.

CINCINNATI, UNIVERSITY OF, an institution of higher learning at Cincinnati, Ohio, founded on bequests made by Charles McMicken in 1858, and by grants made subsequently by the city. It is strictly a municipal university, and is under the exclusive control of the city of Cincinnati. The university was open for instruction in 1873. At present it comprises the following departments: the colleges of liberal arts, engineering, law and medicine, a teachers' college, a graduate department and a technical school. The Clinical and Pathological School of the Cincinnati Hospital and the Ohio College of Dental Surgery are affiliated with the university. The faculty numbers more than 270, and the student enrollment normally is nearly 3,000. There is a library of 88,100 volumes. Close connection is maintained between the city departments and the university, especially in the fields of engineering, chemistry and civics.

CINCINNATUS, *sin sin a'tus*, LUCIUS QUINTIUS, a wealthy patrician of the early days of the Roman Republic. He violently opposed, during his consulship, the passage of the law for the equalization at law of patricians and plebeians. When, in 458 B. C., Minucius, the consul, was surrounded by the Aequians, the messengers of the Senate found Cincinnatus at work on his farm when they came to summon him to the dictatorship. He rescued the army from its peril, marched to Rome laden with spoil and then returned quietly to his farm. At the age of eighty he was again appointed dictator, to oppose the ambitious designs of Spurius Maelius.

"Cincinnatus of the West." George Washington was honored with this title, it having first been applied to him by Lord Byron.

CINDERELLA, *sin der el'a*, the title of one of the oldest and best-loved fairy tales. Cinderella, the heroine, who was ill treated by an unkind stepmother and two envious stepsisters, earned her name because she had to sit among the cinders in the chimney corner. When the prince of the kingdom gave a wonderful ball, good fortune came to her, for her fairy godmother, in the guise of a witch, changed her ragged dress into a beautiful gown, and out of a pumpkin and rats she created a splendid coach, with horses and coachman. With this beautiful equipment she attended the ball.

In the ballroom Cinderella lost her glass slipper, which the prince secured. At last he identified her with it, and they were happily married. Plays and operas have been based on this old tale, which has never lost its charm for young or old. A version of the story was known to the ancient Egyptians and to the Greeks. The English versions were adapted from the story as written by Charles Perrault, a French writer.

CINERARIA, *sin e ra're ah,* a genus of plants consisting of herbs or small shrubs, with small-sized heads of flowers. They were first found in South Africa. The name is derived from the lower leaves, which are of ashy appearance. A number of species are cultivated for garden purposes, and from these an almost endless variety of blossoms of many different colors have been evolved. They are a favorite hothouse plant. Purple, red, and purple and white are the prevailing colors of these popular aster-like flowers.

CINNA, *se'na,* LUCIUS CORNELIUS, an eminent Roman, a follower of Marius. Obtaining the consulship in 87 B. C., after the expulsion of Marius from Rome, he impeached Sulla and endeavored to secure the recall of Marius. Driven from the city, he joined Marius and soon gained possession of Rome. The friends of Sulla were massacred, and Cinna and Marius made themselves consuls, 86 B. C. After the death of Marius the army refused to follow Cinna against Sulla and put him to death in 84 B. C. See MARIUS.

CINNABAR, *sin'na bahr,* red sulphide of mercury, the principal ore from which mercury is obtained, occurring abundantly in Spain, California, China, Austria, Russia, Peru and South Africa. It is of a cochineal-red color, and it is used as a paint under the name *vermilion.* See MERCURY.

CINNAMON, *sin'a mon,* a pleasing condiment, popular with cooks for certain pastries and confections.

CINNAMON

In its native state it is the bark of the under branches of a species of laurel, which is chiefly found in Ceylon, but grows also in other parts of the East Indies. The tree attains the height of twenty or thirty feet, has oval leaves, pale yellow flowers and acorn-shaped fruit. The Ceylonese bark their trees in April and November. The bark curls up into rolls or quills in the process of drying and the smaller quills are introduced into the larger ones for shipment. These are later assorted according to quality by tasters and are made into bundles. An oil of cinnamon is prepared in Ceylon, but the oil of cassia is generally substituted for it; indeed, the cassia bark is often substituted for cinnamon, to which it has some resemblance, although in its qualities it is much weaker. The leaves, the fruit and the root of the cinnamon plant all yield oil of cinnamon, a drug of considerable value.

CIRCASSIA, *sir kash'e a,* a region of European Russia, extending along the eastern shore of the Black Sea. It became Russian in 1829. The principal source of wealth in the district is petroleum.

Circassians, the name of the people who inhabit Circassia. Both the men and women are noted for their physical perfection, and although they are somewhat dark the women for scores of years, until recently, have been sold into Turkish harems. The religion of the higher class is Mohammedan, but the lower classes are drifting away from the strict letter of the faith, and their belief is half Christian. They number about 150,000.

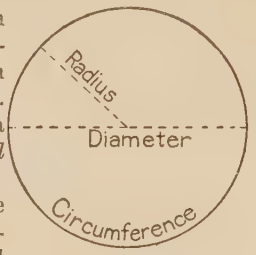
CIRCE, *sur'se,* a fabled sorceress of Greek mythology, who lived in the island of Aeaea, represented by Homer as having converted the companions of Ulysses into swine, after having caused them to partake of an enchanted beverage. Milton, in *Comus,* refers to the fable thus:

> Who knows not Circe,
> The daughter of the Sun, whose charmed cup
> Whoever tasted, lost his upright shape,
> And downward fell into a groveling swine?

Ulysses, under the guidance of Mercury, resisted her enchantments and compelled her to restore his companions.

CIRCLE, *sur'k'l,* a plane figure contained by one line, called the *circumference,* which is so drawn that all its points are equally distant from a certain point within, called the *center.* The *diameter* of the circle is a line drawn through the center and terminat-

ing at the circumference. The *radius* is one-half the diameter. A *great circle* is one on a sphere, whose center coincides with that of the sphere. All other circles on a sphere are *small circles.*



People who have studied higher mathematics have proved that the diameter of a circle multiplied by 3.1416+ will give the circumference. Boys and girls can prove this is a simple way. Measure the distance around a drinking cup, a pan and a pail, then measure the diameter at the same points. Divide the circumference by the diameter and the quotient will be found in each case to be about $3\frac{1}{7}$, or 3.1416+. There is always this same relation between diameter and circumference.

The area of a circle cannot be demonstrated in the same way by boys and girls, but when they have studied geometery they will learn that the area equals the radius (half of the diameter) multiplied by itself and this product multiplied by 3.1416+. In other words, the area equals the square of the radius times 3.1416+. See MENSURATION, subhead *Circle.*

CIRCULA'TION, the flowing of the blood through the arteries, veins and capillaries, whereby the body tissues are provided with nourishment. Arterial blood leaves the left ventricle of the heart, flowing through the aorta and its branches, which carry it to all parts of the body except the lungs. It passes through the capillaries, giving up oxygen and taking carbonic acid, then through the veins, returning to the heart through two large veins that pour their contents into the right auricle of the heart. This auricle contracts, forcing the blood into the right ventricle, which in turn forces it into arteries, that carry it to the lungs, where it gives up carbonic acid and receives oxygen.

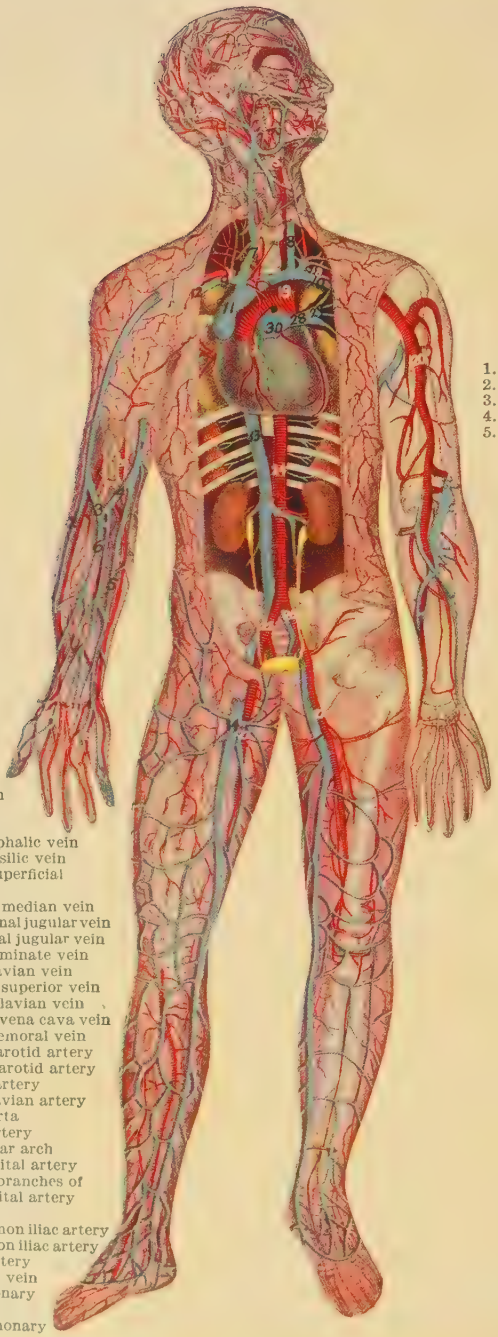
Four pulmonary veins carry the blood from the lungs to the left auricle, which forces it into the left ventricle, whence we commenced to trace it. The circulation from the right side of the heart through the lungs to the left side of the heart is called the *pulmonary circulation,* and that from the left side of the heart through the body to the right side, the *systemic circulation.* A portion of the blood in the intestines is carried through the portal vein to the liver, where, after passing through a fine network of capillaries, it is carried through the hepatic veins to one of the large veins of the systemic circulation. This is called the *portal circulation.* A drop of blood makes the round from the left ventricle and back to it in about thirty seconds.

Although Galen, who had observed the opposite directions of the blood in the arteries and veins, may be said to have been upon the very point of discovering the circulation, William Harvey in 1628 pointed out the connections between the heart, arteries and veins, the reverse directions taken by the blood in the different vessels, the arrangements of valves in the heart and veins so that the blood could flow only in one direction, and the necessity of the return of a large proportion of blood to the heart to maintain the supply. In 1661 Malpighi with a microscope examined the circulation in the web of a frog's foot and showed that the blood passed from arteries to veins by capillaries.

Related Articles. Consult the following titles for additional information:

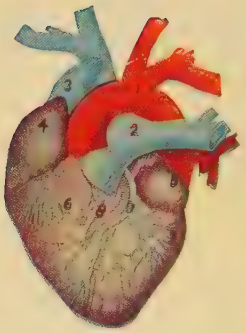
Aorta	Arteries	Heart
Blood	Capillaries	Veins

CIR'CUS. Among the ancient Romans a circus was a long building without a roof, in which public chariot races, exhibitions of pugilism and wrestling and other games took place. It was rectangular, except that one short side formed a half-circle; on both sides and on the semicircular end were the seats of the spectators, in tiers sloping backwards. On the outside the circus was surrounded with colonnades, galleries, shops and public places. There were eight or ten circuses at Rome, of which the largest was the Circus Maximus, 1,875 feet long and 625 feet wide, capable, according to Pliny, of containing 260,000, and according to Aurelius Victor, 385,000, spectators. At present, however, but few vestiges of it remain, and the Circus of Caracalla is in the best preservation. The games celebrated in these structures attained great importance and magnificence. Some of them were feats of skill such as are celebrated to-day—races, gymnastic contests, etc., with men of high rank engaged. Again, some of the spectacles were revolting to the modern mind. There were combats with wild beasts, in which beasts fought with beasts or with men, criminals or volunteers, an ex-



Veins and Arteries

1. Basilic vein
2. Superficial radial vein
3. Median cephalic vein
4. Median basilic vein
5. Anterior superficial ulnar vein
6. Superficial median vein
7. Right internal jugular vein
8. Left internal jugular vein
9. Right innominate vein
10. Left subclavian vein
11. Vena cava superior vein
12. Right subclavian vein
13. Ascending vena cava vein
14. Common femoral vein
15. External carotid artery
16. Common carotid artery
17. Coronary artery
18. Left subclavian artery
19. Arch of aorta
20. Brachial artery
21. Deep palmar arch
22. Palmar digital artery
23. Collateral branches of palmar digital artery
24. Aorta
25. Right common iliac artery
26. Left common iliac artery
27. Femoral artery
28. Pulmonary vein
29. Left pulmonary vein
30. Right pulmonary vein



External View of the Heart

1. Aorta
2. Pulmonary artery
3. Descending vena cava
4. Right auricle
5. Left auricle
6. Right ventricle
7. Left ventricle
8. Left coronary artery
9. Left coronary vein

Scheme of the Circulation

1. Heart
2. Lung
3. Head and upper extremities
4. Spleen
5. Intestine
6. Kidneys
7. Lower extremities
8. Liver and portal vein
9. Aorta
10. Pulmonary artery
11. Ascending vena cava
12. Descending vena cava
13. Pulmonary vein
14. Portal vein
15. Carotid artery
16. Lacteals
17. Thoracic duct

Plate used by permission of the Caxton Company, Chicago.

CIRCULATION OF THE BLOOD

Outline of the Circulation of the Blood

I. Organs
- (1) Heart
  - (a) Shape
  - (b) Size
  - (c) Position
  - (d) Weight
  - (e) Structure
    - (1) Parts
    - (2) Valves
    - (3) Action
  - (f) Nerve supply
  - (g) Function
- (2) Arteries
  - (a) Distribution
  - (b) Structure
    - (1) Coats
    - (2) Capillaries
      - (a) Definition
      - (b) Function
      - (c) Size
      - (d) Structure
  - (c) Circulation in arteries
  - (d) Anastomosing
  - (e) Pulse
- (3) Veins
  - (a) Definition
  - (b) Purpose
  - (c) Structure
    - (1) Coats
    - (2) Valves
  - (d) Circulation of the veins

II. Systems
- (1) Pulmonary
  - (a) From the right side of the heart
  - (b) Through the lungs
  - (c) To the left side of the heart
- (2) Systemic
  - (a) From the left side of the heart
  - (b) Through the body
  - (c) To the right side of the heart
- (3) Portal

III. Blood
- (1) Definition
- (2) Amount
- (3) Temperature
- (4) Composition
  - (a) Corpuscles
  - (b) Serum
- (5) Coagulation
- (6) Functions

IV. Causes of Circulation
- (1) Force of heat
- (2) Elasticity of arterial walls
- (3) Contraction of the heart
- (4) Muscular action
- (5) Act of breathing

V. Functions
- (1) Nourishment
- (2) Purification
- (3) Elimination of waste
- (4) Warmth

VI. Hygiene
- (1) Air and sunlight
- (2) Exercise
- (3) Heat and cold
- (4) Pressure
- (5) Accidents

VII. Diseases
- (1) Congestions
- (2) Inflammation
- (3) Scrofula
- (4) Colds
- (5) Catarrh

VIII. Associated Processes.
- (1) Absorption
- (2) Assimilation
- (3) Secretion
- (4) Excretion

Questions on Circulation

What is circulation? Name the organs of circulation.

Describe the heart. Define arteries; veins.

Explain auricle and ventricle.

Describe the circulation of the blood.

Of what is blood composed?

What are the uses of the blood? What is the normal temperature of the blood?

What is the color of the blood in the veins? In the arteries? What causes the change?

Describe coagulation. What are the parts coagulated?

Give the functions of the red corpuscles.

Distinguish between the pulmonary and systemic circulation.

What vein carries the blood to the liver?

How long does it take the blood to make a complete circuit of the system?

hibition which was especially attractive to the Romans. Under the Empire this kind of show was transferred to the amphitheater.

The expense of these games was often immense. Pompey, in his second consulship, brought forward 500 lions at one combat of wild beasts, which, with eighteen elephants, were slain in five days. These shows were free to the people, and their love for them appears from the cry with which they addressed their rulers: "Bread and the games."

The modern circus is a place where animals are trained to perform antics, and where exhibitions of acrobats and various pageantries, including a large amount of comic acting by clowns are presented for the amusement of the spectators. This form of entertainment has become especially popular. (See BARNUM, PHINEAS TAYLOR).

CIRRHOSIS, *sie ro'sis*, from Greek words meaning *orange-colored*, is the name applied to a disease of the liver, lungs, spleen, heart or stomach. The organ affected becomes somewhat hardened or fibrous, due to an increase of connective tissue, and undergoes gradual degeneration. There are two varieties of the disease; in one the organ decreases in size, and in the other it becomes larger. The liver is most frequently affected. See LIVER.

CISALPINE, REPUBLIC, *sis al'pin*, a state founded by Bonaparte in 1797 in Northern Italy. It included Lombardy, Mantua, Verona, Cremona, Brescia, Bergamo, Rovigo, the Duchy of Modena, Massa, Carrara, Bologna, Ferrara and the Romagna; it had in all an area of over 16,000 square miles and a population of 3,500,000. Austria recognized the republic in the Treaty of Campo Formio, but the new state was dissolved in 1799 by the victories of the Austrians and Russians. It was regained by Napoleon Bonaparte in 1800, took the name of the "Italian Republic" in 1802 and elected Bonaparte as President. Three years later it became the "Kingdom of Italy," with Napoleon as king, and it continued as such until 1814.

CISTERCIANS, an Order of monks, a branch of the Benedictines founded by Robert, abbot of Molseme, in 1098. The habit was white with a black scapular. The rules of the Order were very strict, and for the first century of its existence it included only a few members. Early in the thirteenth century it was joined by Saint Bernard and thirty followers, and from that time on it grew rapidly. By the middle of the fourteenth century there were 700 abbeys located in France, Ireland, Spain, Portugal, Norway, Sweden and Germany. In recent times the Order has declined, and there are now only a few abbeys, principally in Italy and Austria. At the time of their greatest prosperity the Cistercians were much interested in literature and art and collected many manuscripts for their libraries. Their churches were distinguished by their simplicity and had no paintings or sculpture; but it is to them that the beginning of Gothic architecture may be traced.

CISTERN, *sis'turn*, a large tank, either above or below ground, for holding water. Cisterns may be made of wooden staves held together by hoops of iron, galvanized iron or other sheet-metal; they are also frequently made by lining the walls of an excavation in the ground with brick or cement. Cisterns are used for storing water in localities where the inhabitants have to depend upon rain water for domestic purposes, but not for drinking.

If a cistern is circular, with a flat base, the reader may learn how to ascertain how much it will hold by reference to the article Cylinder.

CITIES OF REFUGE, six out of the forty-eight cities given to the tribe of Levi in the division of Canaan, set apart by the law of Moses as places of refuge for the manslayer or accidental homicide. Their names were Kedesh, Shechem and Hebron, on the west side of Jordan; and Bezer, Ramoth-Gilead and Golan, on the east. No part of Palestine was far from a City of Refuge. The manslayer fled to the nearest one, where he was guaranteed a fair trial, safe from personal or mob fury; if not guilty of wilful murder he could remain in the city.

CITIZEN, a member of an organized political society, as a state or nation. Originally, a citizen was any one entitled to share in the management of a city-state, but gradually the limits of citizenship have been extended until now, in modern republics, almost every resident is a citizen. In the monarchies of Europe the term is used to denote a resident of a municipality, the citizen's relations to the state being expressed by the word *subject*. In the United States a citizen is one who owes allegiance and sup-

port to the government and is entitled to its protection; it includes women, children, criminals, persons of all races except alien residents. Citizens are of two classes; they are *natural-born,* that is, born within the jurisdiction of the United States, or *naturalized,* that is, have taken legal steps to renounce allegiance to their former country and swear fealty to the country of their adoption.

Citizenship does not imply the right to vote, for the latter may be withheld or granted to classes or individuals at the will of the government. Women are citizens (the old name for a female citizen was *citess*), but not everywhere are they entitled to vote (see WOMAN SUFFRAGE).

CITRIC, *sit'rik,* **ACID,** the acid of lemons, limes and some other fruits. It is generally prepared from lemon juice, and when pure it is white, inodorous and extremely sharp in its taste. In combination with metals it forms crystalline salts, known as citrates. The acid is used to prevent the formation of colors not wanted in calico printing; it is also used as a substitute for lemon juice in making beverages, and for allaying thirst in fever.

CIT'RON, a large, sour fruit, much like a lemon, but scarcely edible, unless preserved in sugar. The citron tree is small, and has been a favorite since the days of ancient Rome. In the United States it is cultivated only in Florida and California. The name *citron* is also given to a small, hard watermelon that is used for pickles and preserves almost everywhere.

CIT'RUS, an important genus of about thirty plants that includes the orange, citron, lemon, lime, grapefruit and other fruit trees and shrubs, all of which are described in this work under their common names. The citrus plants have rather long, pointed leaves or leaflets, united by a distinct joint to the leaflike stalk; their stamens are united by their filaments into several irregular bundles, and they have pulpy fruits with spongy rinds.

CITY, in the commonly-accepted sense, a large town, but there are no legal restrictions governing the application of the term. In America a city is a thickly-populated section, with legally-defined boundaries, divided into small political units called *wards,* each ward electing one or two men called *aldermen* who join with aldermen from other wards in forming the *common council* or *board of aldermen,* who pass laws called *ordinances* for the government of the community. At the head of the executive department is the *mayor,* whose duty is to enforce all city laws faithfully. Other officers are *city clerk, city treasurer, assessor,* etc., who, with the mayor and aldermen, are elected by the people. Still other officials are appointed to fill other stations, such as street commissioner, police chief, and the like.

There is no legal rule by which it is determined when a village or town is large enough to become a city. For many years Kalamazoo, Mich., then having over 20,000 population, enjoyed the distinction of being the largest town in the world with a village government. In the same state at the same time another town of 800 people lived under a city government, with two wards. The people of each community decide for themselves when they wish a city government, at which time they apply for a *charter* from the state. The charter is a constitution under which the municipality is to be governed.

As a village, a community cannot do many things a city is permitted to do. It cannot go into debt beyond a certain moderate sum for public improvements, while a city may borrow money and issue bonds for repayment for much larger amounts. As a town grows large the ward system of representation in the local law-making body is preferred to the village common council plan, which can have but six members in its legislative body.

One of the peculiar developments of modern times is the centralization of population in cities. Consequently there have arisen certain striking characteristics of city life. The city has become the center of culture and commerce, but at the same time it is often the center of poverty and degradation. It is therefore the breeding place of class antagonism, of criminal influence and of disease. Side by side with these developments have arisen problems which constitute some of the most important social, economic and political questions of the time. See COMMISSION FORM OF GOVERNMENT; CITY PLANNING; CITY MANAGER.

Fifty Largest Cities of the World. In countries where the census is taken regularly and can be relied upon, the census figures are given; in other instances, particularly af-

fecting Chinese and African cities, careful estimates are given:

1. London, 7,252,963
2. New York, 5,602,841
3. Paris, 2,888,110
4. Chicago, 2,497,722
5. Berlin, 2,071,257
6. Tokio, 2,033,321
7. Vienna, 2,031,498
8. Petrograd, 2,019,000
9. Philadelphia, 1,709,518
10. Moscow, 1,618,000
11. Buenos Aires, 1,560,163
12. Constantinople, 1,300,000
13. Warsaw, 1,250,000
14. Osaka, 1,226, 590
15. Calcutta, 1,222,313
16. Rio de Janeiro, 1,128,637
17. Bombay, 979,445
18. Canton, 900,000
19. Budapest, 880,371
20. Hankow, 826,000
21. Tien-tsin, 800,000
22. Glasgow, 784, 496
23. St. Louis, 757,309
24. Liverpool, 746,421
25. Boston, 756,476
26. Sydney, 725,400
27. Manchester, 714,333
28. Naples, 691,982
29. Peking, 690,000
30. Cleveland, 674,073
31. Brussels, 663,647
32. Cairo, Egypt, 654,476
33. Shanghai, 651,000
34. Melbourne, 651,000
35. Milan, 645,366
36. Bangkok, 628,675
37. Fu-chow, 624,000
38. Odessa, 620,155
39. Madrid, 599,807
40. Chung-king, 598,000
41. Munich, 596,467
42. Amsterdam, 595,258
43. Hang-chow, 594,000
44. Algiers, 590,000
45. Leipzig, 589,850
46. Baltimore, 589,621
47. Barcelona, 587,411
48. Pittsburgh, 579,090
49. Rome, 576,435
50. Copenhagen, 559,398

Fifty Largest Cities in the United States. Within recent years the Census Bureau has issued annual estimates of the growth of cities. These are based on the average increase in population from decade to decade and do not take into consideration unusual local conditions which may rapidly increase population. The figures for all of the cities given below are according to the Bureau estimates for 1917:

1. New York, 5,737,492
2. Chicago, 2,547,201
3. Philadelphia, 1,735,514
4. St. Louis, 768,630
5. Boston, 767,813
6. Cleveland, 692,259
7. Detroit, 619,648
8. Baltimore, 594,637
9. Pittsburgh, 586,196
10. Los Angeles, 535,485
11. Buffalo, 475,781
12. San Francisco, 471,023
13. Milwaukee, 445,008
14. Newark, 418,789
15. Cincinnati, 414,248
16. New Orleans, 377,010
17. Minneapolis, 373,448
18. Washington, 369,282
19. Seattle, 366,445
20. Jersey City, 312,557
21. Portland, 308,399
22. Kansas City, 305,816
23. Indianapolis, 283,622
24. Denver, 268,439
25. Rochester, 264,714
26. Providence, 259,895
27. St. Paul, 252,465
28. Louisville, 240,808
29. Columbus, 220,135
30. Oakland, 206,405
31. Toledo, 202,010
32. Atlanta, 196,144
33. Birmingham, 189,716
34. Omaha, 177,777
35. Worcester, 166,106
36. Richmond, 158,702
37. Syracuse, 158,559
38. Spokane, 157,656
39. New Haven, 152,275
40. Memphis, 151,877
41. Scranton, 149,541
42. Paterson, 140,512
43. Grand Rapids, 132,861
44. Fall River, 129,828
45. Dallas, 129,738
46. Dayton, 128,939
47. San Antonio, 128,215
48. Bridgeport, 124,724
49. New Bedford, 121,622
50. Nashville, 118,136

Fifty Largest Cities in Canada. The last regular decennial census in the Dominion was taken in 1911, but in the prairie provinces official counts of the people were made in 1916. The figures below in boldface are 1916 provincial census figures; all others are from the census of 1911:

1. Montreal, 470,480
2. Toronto, 376,538
3. Winnipeg, **162,999**
4. Vancouver, 100,401
5. Ottawa, 87,062
6. Hamilton, 81,969
7. Quebec, 78,190
8. Calgary, **56,302**
9. Edmonton, **53,794**
10. Halifax, 46,619
11. London, 46,300
12. St. John, 42,511
13. Victoria, 31,660
14. Regina, **26,105**
15. Brantford, 23,132
16. Saskatoon, **21,054**
17. Kingston, 18,874
18. Maisonneuve, 18,684
19. Peterborough, 18,360
20. Hull, 18,222
21. Windsor, 17,829
22. Sydney, 17,723
23. Moose Jaw, **16,889**
24. Glace Bay, 16,562
25. Fort William, 16,499
26. Sherbrooke, 16,405
27. Brandon, **15,225**
28. Kitchener, 15,196
29. Guelph, 15,175
30. Westmount, 14,579
31. St. Thomas, 14,054
32. Three Rivers, 13,691
33. New Westminster, 13,199
34. Stratford, 12,946
35. Owen Sound, 12,558
36. St. Catharines, 12,484
37. Verdun, 11,629
38. Moncton, 11,345
39. Port Arthur, 11,220
40. Charlottetown, 11,198
41. St. Boniface, **11,022**
42. Sault Ste Marie, 10,984
43. Chatham, 10,770
44. Lachine, 10,699
45. Galt, 10,299
46. Sarnia, 9,947
47. Belleville, 9,876
48. St. Hyacinthe, 9,797
49. Valleyfield, 9,449
50. Lethbridge, **9,437**

CITY MANAGER, an official appointed by the board of aldermen or common council of a city to manage all its business affairs. Such a system is a modification of the commission form of government (which see), and is the most modern step yet devised in the direction of centralizing authority and responsibility. The city manager is the one man accountable to all the citizens for the conduct of the public affairs of the town, with authority to hire and to discharge subordinates. He is paid a good salary, and he receives his appointment because of ability and fitness, often after a competitive examination. Small cities pay $1,500 to $2,000 per year; large cities, as much as $6,000 to $8,000. Dayton, Ohio, is the largest city which has adopted the plan; fifty or more smaller cities have done so.

How to Study a City

A topical outline of a city is given below. It is subject to such amendment as may be necessary to meet local needs:

THE CITY

I. Map of City
II. Description
- (a) Area and population
- (b) Location
  - (1) In township
  - (2) In county
  - (3) In state
  - (4) Direction from other cities

III. Government
- (a) Chief executive
  - (1) Title
  - (2) How chosen
  - (3) Length of term
  - (4) Duties
- (b) Other officers
  - (1) Financial
    - (a) Treasurer
    - (b) Assessor
    - (c) Collector of taxes
  - (2) Clerk
  - (3) Judicial
- (c) Appointive officers
  - (1) Health
  - (2) Education
  - (3) Parks
  - (4) Streets
  - (5) Water Superintendent
  - (6) Fire
  - (7) Police

IV. Education
- (a) Board of education
- (b) Superintendent of schools
- (c) Public schools and buildings
- (d) Private institutions
  - (1) Kinds
  - (2) Endowments
  - (3) Rank among other schools of same kind

V. Public Utilities
- (a) Rail and water communication
- (b) Street railways
- (c) Water supply
- (d) Lighting systems; how owned
  - (1) Electric light
  - (2) Gas

VI. Parks and Boulevards
- (a) Parks
  - (1) Number
  - (2) Area
  - (3) How controlled
  - (4) How supported
- (b) Boulevards
  - (1) Extent
  - (2) Special rules governing

VII. Commerce and Industry
- (a) Banking strength
- (b) Manufactured articles
  - (1) Kinds
  - (2) Market
  - (3) Annual value
  - (4) Persons employed in manufactures
  - (5) Wages paid annually

VIII. Study of Charter
IX. History
- (a) When settled
- (b) Date of organization as a village
- (c) Date of change to city government
- (d) Notable events
- (e) Persons more than locally known

CITY PLANNING. Formerly cities grew to large proportions without concerted action of their people to build for the highest good and to the best advantage of the community. Little attention was paid to features which would make for public convenience, civic beauty, health and demands of an esthetic nature. The path the calf made through the primeval forest became the main street of the village and eventually the leading thoroughfare of the city. From this in all directions grew the town, often in haphazard fashion.

People have awakened to the error of this irresponsible development, which has been excused because of rapid growth under pioneer conditions. They are learning that definite plans for city development are profitable, and properly carried out make for happiness, health and prosperity.

Accordingly, city plan commissions, headed by competent men—architects, landscape gardeners, builders, sanitary experts—exist now in many cities. Their duty is to enforce growth along lines which shall ultimately be

of greatest benefit to all the people. They provide for expansion of business—retail, wholesale, factory sections—in such parts of town as shall be most convenient and least objectionable; they determine where transportation is needed; where streets and parks shall be placed; how buildings shall be constructed with respect to light, air and sanitation.

Instances are at hand of cities which have demolished miles of buildings in order to work out new plans for streets, boulevards and parks. Such radical steps were taken in Chicago to afford egress from the crowded "loop" district to residence sections. The city of Washington took steps to halt ill-advised development and to build hereafter on plans proposed many years ago. San Francisco, after the disaster of 1906, rebuilt on scientific plans. The new capital city of Australia, Canbarra, is being built according to a plan completely outlined before construction was begun.

CIUDAD JUAREZ, *se oo dahd' hwah'ras,* MEXICO, a city in the state of Chihuahua, on the Rio Grande, directly opposite the Texan city of El Paso. Ciudad Juarez is situated in a region that was a center of the border disturbances in 1916, and on one occasion it was the scene of an anti-American riot. After the capture of Chihuahua city by Villa, in November, 1916, Juarez was made the base of operations of the Mexican government forces. The city lies in a fertile farming and stock-raising district, 3,800 feet above the level of the sea. It is the seat of a Mexican army post and the residence of a United States consul. Population, about 7,000.

CIVET, *siv'et,* or **CIVET CAT,** an animal resembling both the weasel and the fox, found in North Africa and in Asia from Arabia to Malabar and Java. It is from two or three feet long and ten inches high, and of a grayish color, tinged with yellow and marked by dusky spots in rows. Civets prey upon birds and small animals, and they are also fond of the eggs of the crocodile. The body of the civet contains a pouch in which is found a fatty substance which smells like musk. This substance is used in making a valuable perfume.

CIVIL DEATH, the extinction by law of a man's rights as a citizen. A criminal sentenced to be executed suffers civil death as soon as sentence is passed upon him. Imprisonment for life is in effect civil death; in New York state this condition is emphasized by the fact that a life sentence to prison operates automatically as a divorce of the condemned from his wife, if he is a married man. Every tie that binds him to the world is severed.

CIVIL GOVERNMENT, a term which means a government in the control of its citizens, from the Latin *civis,* meaning *citizen.* This definition does not imply that all citizens participate directly in the conduct of affairs, for that is manifestly impossible; it means that the source of all power is in the people, and that they delegate actual control to representatives whom they choose for this task. The basis on which such a government rests is a written instrument called a constitution.

Civil government as it relates to the great business of conducting affairs which pertain to the entire United States is outlined in the diagram accompanying this article.

Related Articles. Consult the following titles for additional information:

GENERAL

Alien
Annexation
Australian Ballot
Autonomy
Ballot
British North America Act
Caucus
Chargé d' Affaires
Charter
Citizen
Civil Death
Coast Guard
Conservation
Constitution
Constitution of the United States
Customs Duties
Diplomacy
Election
Electoral Commission
Exterritoriality
Extradition
Flag
Forest and Forestry
Forests and Forest Reserves in Canada
Franchise
Franking
Free Trade
Government
Imperialism
Income Tax
Inheritance Tax
Internal Revenue
Lands, Public
Law
National Debt
Naturalization
Passport
Primary, Direct
Privy Seal
Province
Recall, The
Registration
Republic
Repudiation
Seal
Single Tax
Sovereignty
Squatter Sovereignty
Stamp
State
Subsidy
Suffrage
Tariff
Tax
Territory
Toll
Treason
Treaty
Voting Machine
Woman Suffrage

LOCAL

Alderman
Burgomaster
City
City Manager
City Planning
Commission Form of Government
Commune
Constable
Coroner
County
Fire Department
Garbage
Mayor
Municipal Government
Municipal Ownership
Police
Poll Tax
Sheriff
Town Meeting

EXECUTIVE

Agriculture, Department of
Ambassador
Bureau
Cabinet
Census
Civil Service
Civil Service in Canada
Commerce, Department of
Consul

UNITED STATES GOVERNMENT

LEGISLATIVE
(Congress)

Senate
Membership--Two Senators from each state.

Qualifications:
- Thirty years of age.
- Nine years a citizen of the United States.
- A resident of state from which he is chosen.

Chosen directly by the people.
Term—six years.
Salary of members--$7,500.

House of Representatives
Membership.
How number of members is determined.

Qualifications:
- Twenty-five years of age.
- Seven years a citizen.
- A resident of state from which chosen.

Chosen directly by the people.
Term—two years.
Salary of members—$7,500.

Powers of Congress

Borrow money; coin money and fix value thereof.
Regulate commerce with foreign nations and with Indian tribes.
Establish bankruptcy laws and naturalization laws. Punish counterfeiting.
Establish and maintain postoffices and postroads.
Grant patents and copyrights.
Establish courts inferior to Supreme Court.
Declare war; grant letters of marque and reprisal; make rules concerning war; punish piracy.
Raise and support armies; provide and maintain a navy.
Provide for militia and power to call it into service.
Exercise full control of District of Columbia.

Powers Denied Congress

Cannot pass ex post facto laws.
Cannot grant titles of nobility.
Cannot assess direct taxes except as they are made uniform.
Cannot levy a tax on exports from any state.
Cannot suspend writ of habeas corpus, except in rare emergency.

EXECUTIVE
(The President)

Chosen by electors.

Qualifications:
- Thirty-five years of age.
- Natural-born citizen.

Term—Four years.
Salary--$75,000.

Sole Powers and Duties
- Commander-in-chief of army and navy
- Fill vacancies during recess of Senate.
- Recommend needed legislation to Congress.
- Adjourn Congress, when Senate and House cannot agree upon date.
- Must execute all the laws of Congress.

Powers Combined with Senate Approval
- Make treaties with foreign nations.
- Appoint civil officers not under Civil Service. Appoint judicial officers.

JUDICIAL

Supreme Court
- Chief Justice and eight Associate Justices.
- Appointed by President.
- Term—for life, or during good behavior.
- Salary—$15,000 and $14,500.
- Extent of power: To all cases
  - of law and equity arising under Constitution;
  - affecting ambassadors and other public ministers;
  - affecting jurisdiction on the high seas;
  - in which the United States is a party:
  - between a state and citizens of another state;
  - between citizens of different states;
  - between a citizen and citizens of a foreign state.

Inferior Courts
- United States Circuit Courts.
- United States District Courts.
- United States Court of Claims.
- United States Commerce Court.

Crown
Czar
Dauphin
Dead-letter Office
Dictator
Divine Right
Doge
Education, Bureau of; Commissioner of
Electoral College
Emperor
Exchequer, Chancellor of the
Executive Department
Governor-General
Imperator
Interior, Department of the
Kaiser
Khan
Khedive
King
Labor, Department of
Lieutenant-Governor
Majesty
Mikado
Mint
Navy, Department of the
Pardon
Pasha
Post-office Department
Premier
President
Prince
Privy Council
Queen
Rajah
Regent
Royal Northwest Mounted Police
Sanitary Commission
Secret Service
Sheik
Stadtholder
State, Department of
Sultan
Supremacy, Royal
Theocracy
Treasury
Veto
Vice-President
War, Department of
Weather Bureau

LEGISLATIVE

Amendment
Assembly
Bundesrat
Civil Law
Common Council
Congressional Record
Congress of the United States
Congressman at Large
Diet
Duma
Executive Council, in Canada
Initiative and Referendum
Legislature
Lobby and Lobbying
Local Option
Parliament
Pure Food Laws
Reichstag
Representatives, House of
Senate
Senate of the United States
Short Ballot
Speaker
Statute
Zemstvo

JUDICIAL

See Court

CIVIL LAW, that code of law which deals with a man's relations with his fellow man, in which the state's only interest is to see that justice rules their conduct towards one another. *Civil* is from the Latin *civis,* meaning *citizen;* civil law is thus explained. It differs from criminal law in that the state becomes responsible for the safety of its citizens against those who commit crimes; the state cannot delegate corrective responsibility to individuals for crimes against the whole people.

If a violation of law affects the welfare only of the persons directly concerned, as when a man refuses to pay a debt or when one person trespasses upon the land of another, civil laws are invoked. A robbery or a murder, on the other hand, renders the whole community unsafe, and criminal laws are invoked; the state then becomes the prosecutor in behalf of the people. See LAW.

CIVIL LIST, a statement of appropriations for support of royal houses of Europe, for which appropriations are made yearly by legislative bodies.

CIVIL SERVICE, a term applied to all service rendered to and paid for by a nation in the conduct of public business, not applying, however, to those engaged in the army and navy and in legislative and judicial positions. It is *citizen service.* It includes within its classification the great number of clerks, stenographers, typists, bookkeepers, messengers, post-office employes, etc., required to keep the public records and serve the public as required by law.

Should a new manager assume charge of a great factory it would be a calamity were he to discharge all employes whose political opinions were not in accord with his views. However, for many years the important business management of the United States was conducted on such a basis. A newly inaugurated President might find that many thousands of minor employes were not members of his political party, having been appointed under a different political régime. This condition, while it in no way affected the public welfare, served as a reason for discharging them and filling their places with men and women who were in political accord with the new administration. Thus it might occur that a vast working force might be changed every four years, to the positive detriment of the country. While merit should have been the determining factor even in political appointments, there was formerly such clamor for office that often party service rather than ability was recognized, to the utter demoralization of the routine of public business and distress of worthy employes.

All the Presidents from Washington to John Quincy Adams, inclusive, had caused the discharge of only 112 government employes, in each case for a substantial reason. Andrew Jackson and his followers, in 1829, inaugurated a new system, to reward those who had worked for the Jackson party at the election; they believed that "to the victors belong the spoils of office." Thousands of experienced employes were dismissed. Succeeding administrations adopted

the same policy. The custom was at length acknowledged to be detrimental to public policy, from the standpoints of efficiency and justice to employes, and because a new President was obliged to spend upon office-seekers much valuable time needed for serious matters. In 1840 Horace Greeley wrote from Washington:

"We have nothing new here in politics, but large and numerous swarms of office-hunting locusts sweeping into Washington daily; all the rotten land speculators, broken bank directors, swindling cashiers, etc., are in full cry for office, office; and even so humble a man as I am is run down by letters, letters."

Office seekers, it is claimed, hastened the death of President William Henry Harrison in 1841. From that time the evils of party appointments and office-seeking grew steadily, until by 1870 it had undermined the efficiency of government administration.

Reform in Civil Service. General Grant, in 1872, undertook to suppress the evil, and, with the consent of Congress, he appointed a commission to make rules and regulations for admission to and continuance in the civil service. The rules reported, however, by this commission were never carried out to any considerable extent, on account of the political pressure which was brought to bear on Congress. President Hayes undertook to carry out Grant's plan, and a reform was instituted in several of the large postoffices of the country.

In January, 1883, Congress authorized the President to appoint, with the advice and consent of the Senate, three civil service commissioners, whose duty was to aid the President in preparing suitable rules providing for open, competitive examinations for testing the fitness of applicants for the public service, such examinations to be practical in their character, and, so far as might be, to relate to those matters which would fairly test the relative capacity and fitness of the persons examined, to discharge the duties of the service.

Rules of the Civil Service. The present rules were made effective April 15, 1903. In a general way they are as follows:

They require that there must be free, open examinations of applicants for positions in the public service; that appointments shall be made from those graded highest in the examinations; that appointments to the service in Washington shall be apportioned among the states and territories according to population; that there shall be a period (six months) of probation before any absolute appointment is made; that no person in the public service is for that reason obliged to contribute to any political fund or is subject to dismissal for refusing to so contribute; that no person in the public service has any right to use his official authority or influence to coerce the political action of any person. Applicants for positions shall not be questioned as to their political or religious beliefs and no discrimination shall be exercised against or in favor of any applicant or employe on account of his religion or politics. The classified civil service shall include all officers and employes in the executive civil service of the United States except laborers and persons whose appointments are subject to confirmation by the senate.

Examinations. These are conducted by boards of examiners chosen from among persons in government employ and are held twice a year in all the states and territories at convenient places. In Illinois, for example, they are usually held at Cairo, Chicago and Peoria. The dates are announced through the newspapers or by other means. They can always be learned by applying to the commission or to the nearest postoffice or custom house. Those who desire to take examinations are advised to write to the commission in Washington for the "Manual of Examinations," which is sent free to all applicants. It is revised semiannually to Jan. 1 and July 1. The January edition contains a schedule of the spring examinations and the July edition contains a schedule of the fall examinations. Full information is given as to the methods and rules governing examinations, manner of making application, qualifications required, regulations for rating examination papers, certification for and chances of appointment, and as far as possible it outlines the scope of the different subjects of general and technical examinations. These are practical in character and are designed to test the relative capacity and fitness to discharge the duties to be performed. It is necessary to obtain an average percentage of 70 to be eligible for appointment, except that applicants entitled to preference because of honorable discharge from the military or naval service for disability resulting from wounds or sickness incurred in the line of duty need obtain but 65 per cent. The period of eligibility is one year.

Qualifications of Applicants. No person will be examined who is not a citizen of the United States; who is not within the age limitations prescribed; who is physically disqualified for the service which he seeks; who has been guilty of criminal, infamous, dishonest or disgraceful conduct; who has been dismissed from the public service for delinquency and misconduct or has failed to receive absolute appointment after probation; who is addicted to the habitual use of intoxicating liquors to excess, or who has made a false statement in his application. The age limitations in the more important branches of the public service are: Postoffice, 18 to 45

years; rural letter carriers, 17 to 55; internal revenue, 21 years and over; railway mail, 18 to 35; lighthouse, 18 to 50; life saving, 18 to 45; general departmental, 20 and over. These age limitations are subject to change by the commission. They do not apply to applicants of the preferred class. Applicants for the position of railway mail clerk must be at least 5 feet 6 inches in height, exclusive of boots or shoes, and weigh not less than 135 pounds in ordinary clothing and have no physical defects. Applicants for certain other positions have to come up to similar physical requirements.

Method of Appointment. Whenever a vacancy exists the appointing officer makes requisition upon the civil service commission for a certification of names to fill the vacancy, specifying the kind of position vacant, the sex desired and the salary. The commission thereupon takes from the proper register of eligibles the names of three persons standing highest of the sex called for and certifies them to the appointing officer, who is required to make the selection. He may choose any one of the three names, returning the other two to the register to await further certification. The time of examination is not considered, as the highest in average percentage on the register must be certified first. If after a probationary period of six months the name of the appointee is continued on the roll of the department in which he serves the appointment is considered absolute.

Removals. No person can be removed from a competitive position except for such cause as will promote the efficiency of the public service and for reasons given in writing. No examination of witnesses nor any trial shall be required except in the discretion of the officer making the removal.

Salaries. Entrance to the department service is usually in the lowest grades, the higher grades being generally filled by promotion. The usual entrance grade is about $900, but the applicant may be appointed at $840, $760 or even $600.

Extent of the Service. Before the United States entered the World War there were 480,327 men and women in government employ who were protected in their positions by the civil service law. The number increased in 1917 by many thousands. Of the whole number named above, 34,000 were in the departments at Washington, and about 426,000 were stationed in various parts of the country. The last large group of government employes to be passed to the civil service list were the fourth-class postmasters, to the number of 47,000.

Civil Service in Cities. Civil service in the large cities is now, to a considerable extent, under laws similar to those described above. The most marked effect of these laws in the cities has been to relieve the mayors and heads of departments from much of the pressure of applicants for office, thus leaving them more free to attend to their important public duties. It has also relieved city employes from the unfair burden of political assessment. No officer or employe can solicit or receive pay, or be in any manner concerned in soliciting, receiving or paying any assessment, subscription or contribution for any party or political purpose.

CIVIL SERVICE IN CANADA. The civil service of Canada is controlled by a Civil Service Commission, whose office is at Ottawa. This commission, composed of three members and a secretary, is appointed by the Governor-General in Council. Its duties are to test and pass upon the qualifications of candidates for admission and promotion; the actual work of examination is done by examiners under the control of the commission. The commission's powers also include the right to investigate the operation of the civil service laws, either independently or at the request of the minister or of the Governor-General.

The service is divided into two great branches known as the *inside* and the *outside* service. The *inside* service includes the employes of the executive departments at Ottawa, and the employes in a number of offices, such as those of the Auditor-General, the Governor-General's secretary, etc. The *outside* service includes the rest of the public service, such as the customs' officials, railroad and post-office employes. Thus the civil service list includes practically all the employes of the Dominion government except the heads of the departments.

Though the details of the classification and qualifications are too numerous to consider here, one fact of great importance must be noted. Members of the civil service pay five per cent of their salaries into a retirement or pension fund. The Governor-General in Council grants a pension from this fund to any person "who has served in an established capacity in the civil service for ten years or upwards, and who has attained the age of sixty years or become incapacitated by bodily infirmity from properly performing his duties." After a service of ten years an employe is granted a pension of ten-fiftieths of his average salary for the last three years; for each year of service over ten and up to thirty-five he is entitled to an additional one-fiftieth. If a person

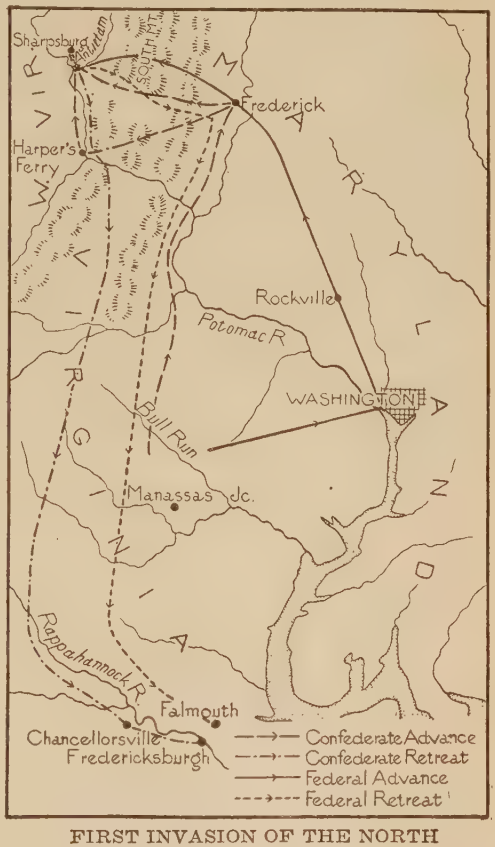
dies while in the service, the amount to his credit in the retirement fund is paid to his legal heirs.

CIVIL WAR IN AMERICA, the great struggle from 1861 to 1865 between the Southern and the Northern states of the Union. The fundamental cause of the war was the growth of the institution of slavery in the South, after it had long been practically abolished in the North. This led to important differences of economic and political opinion and, especially, to the emphasis in the South of the principle of states' rights. The natural outgrowth of such a belief was the doctrine of secession, and this was ultimately adopted. Between December 20, 1860, and February 1, 1861, the seven states of South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana and Texas passed ordinances of secession. On February 4, the government of the Confederate States of America was organized, and by July four other states, Virginia, North Carolina, Tennessee and Arkansas, had joined this new union.

In spite of numerous attempts at compromise, the war was meantime opened by the seizure on the part of Southern states of United States forts and arsenals, a step which had been made easy by the Southern sympathies of members of Buchanan's Cabinet. The first gun was fired at Fort Sumter, in the harbor of Charleston, S. C., on April 12, 1861, and the fort surrendered on the same day. Immediately after this event (April 15), President Lincoln called for 75,000 volunteers and declared the coast of the Southern states to be under blockade. The Confederacy also issued a call for volunteers and retaliated for the blockade by issuing letters of marque and reprisal.

The border states of Missouri, Kentucky, Maryland and Delaware were of immense importance to both parties, and steps were immediately taken to secure control of them. They at first remained neutral, but they later joined the Union cause.

The Year 1861. The first real military movements of the war occurred in the western part of Virginia, each government desiring to hold this territory as a buffer against the operations of the other. The Confederates were soon driven from the region by General McClellan. The next important event was the first Battle of Bull Run, which resulted from an attempt on the part of General Irving McDowell to begin a campaign for the capture of Virginia. It resulted in a disastrous Federal defeat. Thereafter, General McClellan was called



FIRST INVASION OF THE NORTH

from West Virginia to take charge of the Federal troops, but he occupied the remainder of the year in increasing, drilling and equipping his force. A Federal force under Benjamin F. Butler suffered an important defeat at Big Bethel, and another force was almost completely destroyed at Ball's Bluff. Meantime, the State of Missouri was being saved to the Union by the activity of General Lyon, and in spite of a severe defeat at Wilson's Creek, in which Lyon was killed, the Federals under General

Curtis drove the Confederates from the territory.

Events of 1862. The year 1862 opened with rather gloomy prospects for the Union. The military situation improved in the spring, however, and at Mill Spring a decisive victory for the Federals under Thomas practically cleared Kentucky of Confederate soldiers. In February a Union force under General Grant, with the aid of a river fleet under Commodore Foote, captured Forts Henry and Donelson, with about 15,000 prisoners and vast amounts of ammunition, artillery and supplies. In April occurred the Battle of Shiloh, in which, after a terrible struggle, the Federals under Grant were victorious, and the able Confederate general, A. S. Johnston, was killed. A few days after the Battle of Shiloh the Federals occupied Corinth, an important strategic position. Late in the same month a large Union force under General Butler, ably assisted by Admiral Farragut with a fleet, reduced the forts guarding New Orleans and took possession of the city. About the same time, General Polk and Commodore Foote were capturing the important Confederate position on Island No. 10. It was during the month of March of this year, also, that the famous battle between the *Monitor* and the *Merrimac* (renamed the *Virginia*) occurred in Hampton Roads.

In the early spring of 1862, General McClellan, with the Army of the Potomac, undertook the first general land campaign of the war, in an effort to fight his way to Richmond and capture the city, which had been made the Confederate capital. After a campaign lasting for more than four months, of which the last month witnessed almost continuous fighting, the Federals were compelled to abandon the project, leaving Lee, the great Confederate chieftain, in practical control of the state of Virginia. Another campaign to the same end was immediately undertaken by General Pope; but on August 30, at the old battlefield of Bull Run, the Confederates won another hard-earned but complete triumph. After the second Battle of Bull Run, Lee determined upon a bold invasion of the North, in order to gain the border state of Maryland and to win a victory in the enemy's country, in the hope of making that victory the basis of terms of peace. He advanced into Maryland without serious opposition, but was overtaken at South Mountain, September 14, where a determined battle raged for a few hours. On the following day another fierce conflict was fought near Sharpsburg on Antietam Creek, and as a result Lee was compelled to retreat into Virginia and abandon his projected invasion. However, the Union army, besides its losses in battle, lost 12,000 men who had been captured by "Stonewall" Jackson at Harper's Ferry.

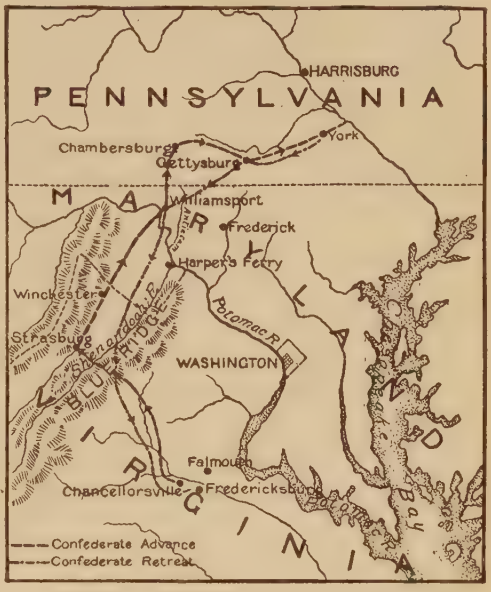
After Antietam, McClellan, on account of his dilatory tactics, was superseded as commander of the Army of the Potomac by General Burnside. The army fought but one battle under its new commander. This was at Fredericksburg, where the Federals attacked a strong Confederate position and suffered terrible slaughter without gaining any advantage. Meanwhile, in the west the Confederates had made determined efforts

MILITARY OPERATIONS IN THE WEST IN 1862

to regain Kentucky and Tennessee. General Bragg, with about 45,000 men, had marched into the state, occupying important positions, but was defeated at Perryville by General Buell and compelled to retreat, while Rosecrans had repulsed a determined attack by Van Dorn at Corinth. Rosecrans succeeded Buell as commander of the Army of the Cumberland, and on the last day of the year he met Bragg's army, which had returned to Tennessee, at Murfreesboro. After a terrific three days' battle the Confederates retreated.

Events of 1863. The year 1863 witnessed the crucial campaigns of the struggle, the turning point of the war. In the east, Burnside was succeeded by Joseph Hooker. At Chancellorsville Lee inflicted on Hooker a terrible defeat, and the victories at Chancellorsville and Fredericksburg encouraged Lee to make another invasion of the Northern states. The two armies therefore advanced northward on opposite sides of the Blue Ridge, each hastening to be the first to cross the Potomac. Just before the crucial point of this campaign, Hooker was relieved and Meade was placed in command of the Federal army. He immediately crossed the Potomac and harassed Lee until he was forced to give battle. This was at Gettysburg on July 1 to 4, where, after one of the most important combats of modern times, the Confederate advance was checked. This Federal victory was almost duplicated on exactly the same day at Vicksburg in the southwest, where U. S. Grant had been conducting a long siege and bombardment. The Confederate General Pemberton surrendered on July 4. In the same month, Port Hudson surrendered to General Banks, and within a few weeks the Mississippi River was freed from Confederate control. The year of 1863 witnessed important events in the states of Kentucky and Tennessee. First was the Battle of Chickamauga, in which the Federal Army of the Cumberland under Rosecrans was almost completely destroyed by the Confederates under Bragg. Soon afterwards, Grant became head of the Department of the Mississippi, which included all the western armies, and in November he directed the great Battles of Chattanooga, including the celebrated "Battle above the Clouds" and the gallant storming of Missionary Ridge, by which the Confederates were completely routed.

Grant in Command. In the following spring, Ulysses S. Grant, who had displayed remarkable ability in the west, was made commander in chief of all the armies of the Union and took personal charge of the Army of the Potomac in Virginia. Under his



SECOND INVASION OF THE NORTH

direction an army of 100,000 men under General Sherman was to advance from Chattanooga to Atlanta and, if possible, crush the army of General Joseph E. Johnston, while the Army of the Potomac was to proceed toward Richmond and capture or destroy the famous Army of Northern Virginia under Lee. The advance was begun May 4. The first battle in the east was on May 5, in the so-called Wilderness, just south of the Rapidan River. Neither side gained a decisive victory. Grant continued his movement by ordering a march around Lee's right flank, but was again confronted at Spottsylvania Court House by Lee's whole army and was defeated in his purpose to crush that force. Again taking up the movement about the enemy's right, he was compelled to give battle at the North Anna River, but was again defeated and for the third time made a circuitous march to the left about Lee's position. At Cold Harbor the two armies again met, and after probably the most stubborn contest of the whole war Grant withdrew and attempted by his usual method to advance towards Richmond. At

Petersburg he was brought to an abrupt halt and was compelled to begin a siege, lasting nearly a year.

Meantime, in the Shenandoah Valley, the Confederates under Early had threatened Washington and had made costly raids upon Northern towns, but in the summer of 1864 they were driven from the valley by Federal cavalry under Sheridan. During this summer General Sherman was carrying out his part of the general campaign, advancing

SHERMAN'S MARCHES

slowly but steadily toward the important city of Atlanta against a brilliant resistance by General Joseph Johnston. Johnston was superseded, however, just as Sherman's campaign was drawing to a close, by General Hood. He was unable to stop the advance, and Sherman entered Atlanta, September 2. It was two months later that he left Atlanta and began his march to the sea, during which he destroyed everything of value in a strip sixty miles wide. He occupied the city of Savannah on Christmas Day. Meantime, General Hood had hoped to draw him from this operation by making a counter movement toward the north. Sherman dispatched Thomas to defend the State of Tennessee, and he did it admirably. Occupying Nashville, he awaited the approach of the Confederate force until December 15, when he opened a battle which resulted in the complete destruction of the Confederate army, the 15,000 survivors never being reorganized. On the sea the Union cause was also victorious during this year, the *Alabama,* the most conspicuous of the Confederate privateers, being sunk by the United States corvette *Kearsarge,* in the harbor of Cherbourg, France. In Mobile Bay another daring feat had been placed to the credit of the American Navy, Rear Admiral Farragut being the hero of the occasion.

Last Months of the War. The successes of the Union arms during 1864 were to culminate in the early spring in the complete defeat of the Confederate cause. General Sherman left Savannah February 1, marched with almost no opposition through the Carolinas and was soon ready to coöperate with Grant in the final campaign of the war. During the winter, though the Union army had gained little in its conquest of Virginia, the siege which the Confederates had endured at Richmond and Petersburg had reduced their power of resistance, and Lee determined to evacuate both places, attempt to join Johnston's army, which had made a faint protest against Sherman's advance, and flee to the mountains, where the contest could be continued indefinitely. The attempts of the Confederates to cut their way out of Petersburg, however, resulted in serious losses, and when the evacuation finally took place it was under such difficult conditions that Lee soon found himself confronted with the necessity of surrendering. This took place at Appomattox Court House, April 9, 1865. The wild rejoicing which this news caused at the North was suddenly hushed on the following Friday, April 14, by the assassination of President Lincoln, who, because of his unfailing common sense and high purposes, had become the central figure of the whole struggle. On April 21 Johnston surrendered to Sherman after a week of negotiation, and by May 26 all the forces of the Confederacy had laid down their arms. On May 10 President Jefferson Davis was captured and was sent a prisoner to Fortress Monroe.

Results. The war had lasted four years; it had commanded the services, all told, of

more than four million men three-fourths of whom were in the armies of the North. Nine of every ten men in the South, and four of every nine in the North, had served in the armies for an average of three years; 110,000 Union soldiers were killed in battle or died from wounds, while 250,000 others died from disease, exposure or other causes. The South lost 94,000 men in battle, and nearly 200,000 others died in the service. Thus, in both armies, an average of 700 men died each day from the beginning of the war to the end. The war cost the United States government in money fully three and a half billion dollars; it cost the Confederacy fully two billion dollars. In addition to these sums the United States government has paid out to Union soldiers more than three billion dollars in pensions. The total cost to both sections, excluding the terrible destruction of property and the loss caused by the check to production, doubtless amounted to at least nine billion dollars; this was an amount quite beyond precedent thus far in the world's history.

The greatest result of the whole contest was the abolition of slavery, which had been a constant source of weakness and dissension for a century. It made possible a real unity of all sections by removing the most conspicuous differences in their modes of life and thought. From the constitutional standpoint it decided that the United States was to be an "indestructible union of indestructible states."

Related Articles. Consult the following titles for additional information:

HISTORY AND POLITICS

Abolitionists
Alabama, The
Andersonville
Appomattox Court House
Carpetbaggers
Compromise of 1850
Confederate States of America
Crittenden Compromise
Dred Scott Decision
Emancipation Proclamation
Fugitive Slave Laws
Hampton Roads Conference
Kansas-Nebraska Bill
Mason and Dixon's Line
Missouri Compromise
Nullification
Reconstruction
Secession
Slavery
States' Rights
Tariff
Trent Affair
Underground Railroad

BATTLES

Antietam
Ball's Bluff
Bull Run
Cedar Creek
Cedar Mountain
Chancellorsville
Chattanooga
Chickamauga
Cold Harbor
Fair Oaks
Five Forks
Fort Sumter
Fort Henry and Fort Donelson
Fredericksburg
Gettysburg
Kenesaw Mountain
Malvern Hill
Mechanicsville
Mobile Bay
Monitor and Merrimac
Murfreesboro
Nashville
Petersburg, Siege of
Shiloh
Spottsylvania Court House
Wilderness

LEADERS

Bragg, Braxton
Burnside, Ambrose E.
Butler, Benjamin F.
Davis, Jefferson
Early, Jubal A.
Farragut, David G.
Foote, Andrew H.
Grant, Ulysses S.
Hood, John B.
Hooker, Joseph
Jackson, Thomas J.
Johnston, Albert S.
Johnston, Joseph E.
Lee, Robert E.
Lincoln, Abraham
Longstreet, James
McClellan, George B.
Meade, George G.
Pemberton, John C.
Porter, David D.
Rosecrans, William S.
Semmes, Raphael
Sheridan, Philip
Sherman, William T.
Thomas, George H.
Wilkes, Charles
Winslow, John A.

CLAIBORNE'S REBELLION, a dispute arising in the colonial history of Virginia and Maryland, in which the central figure was William C. Claiborne (1589–1676). He settled the Isle of Kent in Chesapeake Bay in 1631, established a trading post, and induced many colonists to join him there. As soon as Lord Baltimore was well established in Maryland he claimed Kent as a part of his colony, over the protest of Claiborne, who claimed it as his own, with Virginia more entitled to ownership than Maryland, for Kent had representation in the Virginia assembly. Virginia stoutly supported Claiborne. For years the dispute continued, with occasional loss of life and property; Claiborne was kept from the island by Baltimore's colonists. The ownership of the land in dispute was not settled until 1776, when Virginia withdrew its claim.

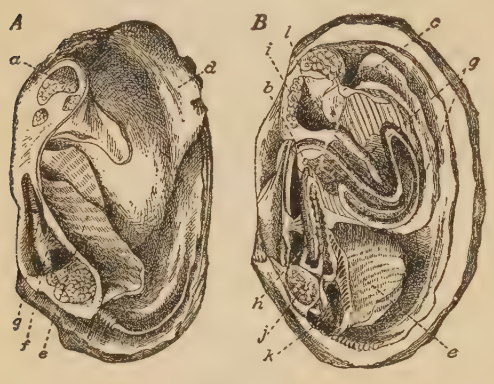
CLAIMS, COURT OF. See COURT OF CLAIMS.

CLAIRVOYANCE, *klair voy'ans,* the alleged power of persons who claim to possess the gift of seeing into the future and thus being able to foretell coming events. People who practice this supposed art are called *clairvoyants;* they are ready to give advice on every conceivable subject—investment, speculation, courtship, marriage, lost articles—and ask their credulous patrons to believe that their information comes from beyond the range of human vision. Without hesitation they will advise a man how to acquire wealth, while unable to accumulate it for themselves.

A crusade against clairvoyants in most cities has greatly reduced their number. They are subject to arrest and prosecution everywhere.

CLAM, a shell-fish, of which the salt water variety is a food delicacy. It is one of the mollusca (see MOLLUSK), and there are a number of species. In America the name is applied to two species, the hard shell, or *quahog,* and the long, or soft, clam. The

quahog has a nearly globular shell and lives on sandy bottoms, on which it stands erect on its thin edge. It is found from Cape Cod south, in water from fifteen to forty feet deep, and in city markets it is generally known as the *clam*. The young are known as *little necks;* these are the most highly prized of all the clam foods.



THE CLAM

A—Right valve of Shell, to show internal organs.
a. Anterior muscle for closing shell.
b. Opening of reproductive organ.
c. Brain.
d. Foot.
e. Gill.
f. Heart.

B—Dissection.
g. Intestine.
h. Kidney.
i. Liver.
j. Rear muscle for closing shell.
k. Space through which water passes in leaving shell.
l. Stomach.

Soft clams have a thin, smooth, somewhat oval shell and possess siphons that are often longer than the shell itself. These clams burrow in the sand above low water mark to such a depth that only the tips of their siphons protrude. When disturbed they emit a spurt of water from the siphon and withdraw from sight. They are obtained by digging them from the sands at low tide, and in many places they are found in large numbers. They are highly prized for food, and under favorable conditions are often cultivated. The term *clam* is also applied to fresh water mussels (see MUSSEL). The shell of the quahog was used as money by the Indians who formerly inhabited the New England states (see WAMPUM).

CLAN, the name given to an indefinite social institution which has existed in almost every stage of civilization, both in Eastern and Western countries. It signifies a group of families claiming descent from common ancestors and united under one leader. The most common principle upon which the clan was organized was the obligation of all members to avenge one another's injuries. The most familiar form of clanship was furnished by the Highlanders of Scotland. Among them the name of the clan was frequently formed from that of the original ancestor, with the prefix *mac,* meaning *son;* thus the MacDonalds were the sons of Donald, and every individual of that name was considered a descendant of the founder of the clan and a brother of every one of its members. The chief exercised his authority by right of inheritance as the father of his clan. The clansmen revered and served the chief with the blind devotion of children. Each clan occupied a certain portion of the country, and hostilities with neighboring clans were frequent.

CLARENDON, EDWARD HYDE, Earl of (1608–1674), chancellor of England. He began his political career in 1640 as a member of the Short Parliament, and he was later in the same year returned to the Long Parliament. At first he acted with the more moderate of the popular party, but gradually separated himself from the democratic movement until, by the autumn of 1641, he was recognized as the leader of the king's party in the House. Upon the breaking out of the Civil War he joined the king, and was his valued aid until the latter's execution.

In September, 1649, he joined Prince Charles at The Hague. After Cromwell's death Clarendon did more than any other man to promote the restoration of Charles, who as a reward made him lord chancellor. The marriage of the duke of York with his daughter, Anne Hyde, confirmed for a time his power, but by 1663 his influence with the king began to decline, and his station as prime minister made the nation regard him as answerable for the ill success of the war against Holland and for the sale of Dunkirk. In 1668 the king deprived him of his offices, an impeachment for high treason was commenced against him and he was compelled to seek refuge in Calais.

CLARET, *klair'et,* a name generally applied to any red table wine, but more properly applied to Bordeaux wines. The term was first used in England, and it never became current in France.

CLARINET', or **CLARIONET'**, a wind instrument of the reed order, regulated by the fingers on eighteen holes, thirteen of them having keys, the tone being produced by

the vibration of a thin reed in the mouthpiece. Its lowest note is E below the F clef, from which it is capable, in the hands of good performers, of ascending more than three octaves. A clarinet can be played in only one key, therefore different clarinets are attuned to different keys, B flat, A flat and E flat being those most commonly used. The instrument was invented as early as the year 1690.

CLARK, CHAMP [JAMES BEAUCHAMP] (1850–), an American lawyer and Democratic politician, born in Anderson County, Ky., and educated in the common schools and at Kentucky University, Bethany College and the Cincinnati Law School. At different times he was employed as farm laborer, clerk, editor, lawyer and later became president of Marshall College in West Virginia. He removed to Missouri, and in 1889 was elected a member of the House of Representatives. From that date he has served continuously in that body, except for two terms, from 1891 to 1893, and from 1895 to 1897. In 1911 he was elected Speaker of the House of Representatives, succeeding "Uncle Joe" Cannon, when the Republicans lost control of that body, and in the following year was an unsuccessful candidate for the Democratic nomination for President, being defeated by Woodrow Wilson, but not until the forty-sixth ballot. He was reëlected Speaker in 1913, 1915 and 1917. When the Democrats lost control of the House of Representatives in the elections of 1918 Clark was succeeded in the Speakership in 1919 by a Republican.

CHAMP CLARK

CLARK, FRANCIS EDWARD (1851–), the founder of the United Society of Christian Endeavor, which grew from a small group in a single church until it reached around the world and embraced millions in its membership (see CHRISTIAN ENDEAVOR, UNITED SOCIETY OF). Clark was born in Aylmer, Ont., and was graduated at Dartmouth College and at Andover Theological Seminary. He held Congregational pastorates at Portland, Me., where the first Christian Endeavor group was organized, from 1876 to 1881, and in Boston, from 1883 to 1887.

He made five trips around the world in the interests of the Christian Endeavor work; became editor of *The Golden Rule,* the organ of the Society, and wrote more than a score of books.

CLARK, GEORGE ROGERS (1752–1818), an American pioneer, of invaluable service to his country for more than a generation. He began life as a land surveyor. In 1776 he moved to Kentucky and soon became the leader of the frontiersmen. He was largely instrumental in securing the organization of Kentucky as a separate county. In 1777, then a major, Clark obtained means from Virginia to attack the fort at Kaskaskia, which he captured in the following year. To revenge an invasion of Kentucky by Canadians and Indians, he destroyed an Indian town in Ohio in 1780. In the same year he went to Richmond to obtain approval from the authorities for his plans for the capture of Detroit, and while there took a command under Baron Steuben to defend Virginia against an invasion by a British force. In 1782 he gathered a large force and marched against Indian towns on the Miami and Scioto, five of which were destroyed. About twelve years later he accepted a commission as major-general in the French army, to conduct an expedition against the Spanish possessions on the Mississippi. General Clark's later years were spent in poverty.

CLARK, WILLIAM (1770–1838), an American explorer, who with Meriwether Lewis revealed knowledge to the world regarding the vast wilderness in 1804–1805 between the Mississippi River and the Pacific Ocean (see LEWIS AND CLARK EXPEDITION). He was born in Virginia, but was taken by his parents to Louisville, Ky., in 1784. He served in Indian campaigns with Wayne, but resigned from military life in 1796. In 1803 he again entered the army as second-lieutenant, and in the following year was placed in joint command with Lewis of the expedition for exploration of the Northwest. Upon his return he was made brigadier-general of militia, was governor of Missouri territory from 1813 to 1821, and from the following year until his death was superintendent of Indian affairs, with headquarters at Saint Louis.

CLARKSBURG, W. VA., founded in 1785 and named for George Rogers Clark, is the

county seat of Montgomery County, ninety-seven miles southeast of Wheeling, on the Baltimore & Ohio Railroad. Tributary to the city are ninety coal mines, and there is an abundant supply of natural gas. Population, 1910, 9,201, in 1917, 12,960 (Federal estimate).

CLARK UNIVERSITY, an institution for postgraduate study, at Worcester, Mass., founded in 1887 by James Gilman Clark. Its special object is to afford educators and specialists the best opportunities for research along the lines in which they are interested. In accordance with the terms of a bequest by Mr. Clark, a collegiate department was organized in 1902, to be conducted upon the same general plan as that of the postgraduate department. The University publishes the *American Journal of Psychology* and the *Pedagogical Seminary*. Many important memoirs and monographs have also been published by its students and graduates. There are over twenty instructors and about 100 students, and the library contains 65,000 volumes.

CLASSIFICA'TION, in botany and zoölogy, the system of arranging plants and animals into groups according to similarities of structure. The principal divisions are explained in detail under the headings FAMILY, GENUS, ORDER, SPECIES, VARIETY.

CLAUD'IUS, (10 B. C.–A. D. 54), a Roman emperor, whose full name was TIBERIUS CLADIUS DRUSUS NERO GERMANICUS. He was the son of Claudius Drusus Nero, stepson of Augustus. He lived in privacy, spending his time in writing and studying, until the murder of Caligula, when he was dragged from his hiding place and proclaimed emperor (A. D. 41). His reign was marked by the embellishment of Rome and by successes in Germany and Britain. Latterly he became debauched and left the government largely to his infamous wife, Messalina, who with his freedmen committed the greatest enormities. He was poisoned by his fourth wife, Agrippina, the mother of Nero.

CLAXTON, PHILANDER PRIESTLEY (1862–), an American educator, born in Bedford County, Tenn. He received his degree from the University of Tennessee and did postgraduate work at Johns Hopkins University and in Germany. After serving successively as superintendent of schools at Kinston, Wilson and Asheville, N. C., he became in 1893 professor of pedagogy in the North Carolina State Normal and Industrial College. From 1902 to 1911 he was professor of education in the University of Tennessee. In July, 1911, he became United States Commissioner of Education; in that post he has done more than any of his predecessors to make the work of the Bureau of Education effective among the common schools.

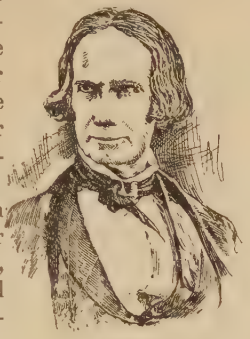
CLAY, the name given to various earths, the most familiar variety being that used for making bricks and tile. But there are other and rarer varieties of great value, which many people do not identify as clay. Clay consists of silicate of aluminum, with small proportions of the silicate of iron, calcium, magnesium, potassium and sodium. All the varieties are characterized by being weighty, compact and hard when dry, but plastic when moist; smooth to touch; not readily diffusible in water, but when mixed, not readily settling in it. Their tenacity and ductility when moist and their hardness when dry have made clays from the earliest times the materials of bricks, tiles and pottery.

One of the rarest of the clays is *kaolin* (which see), a white clay with occasional gray and yellow tones; this is the purest. *Porcelain clay* is one of the best varieties. *Potter's clay* and *pipe clay*, which are similar but less pure, are generally of a yellowish or grayish color, from the presence of iron. Fire clay is a very refractory variety, always found lying immediately below the coal; it is used for making fire bricks and crucibles and for lining furnaces used in smelting iron and some other metals. *Loam* consists of clay mixed with sand, oxide of iron and various other foreign ingredients. Other varieties are *fullers' earth* (which see), *Tripoli* and *boulder clay*, the last a hard clay of a dark brown color, with rounded masses of rock of all sizes embedded in it, the result of glacial action.

The distinctive property of clays as ingredients of the soil is their power of absorbing ammonia and other gases and vapor generated on fertile and manured lands; indeed, no soil will long remain fertile unless it has a fair proportion of clay in its composition.

CLAY, HENRY (1777–1852), one of the greatest of American statesmen, who was named the "Great Pacificator" because of his sincere effort to avert war in the United

States over the slavery question. His unalterable views so influenced his career that he failed to attain the Presidency; he realized at last that the honor would never come to him, but he said, "I would rather be right than be President."



HENRY CLAY

Clay was born in Ashland, Hanover County, Va., April 21, 1777. He received practically no education, but was able to begin the study of law and opened his first office at Lexington, Ky., in 1797. He soon became famous as a jury advocate and public speaker, and at the age of twenty-six was a member of the Kentucky legislature. In 1806–1807 and 1810–1811 he filled unexpired terms in the United States Senate although not having attained legal age to qualify as a Senator at the date of his first appointment. In 1811 he was chosen to the House of Representatives, where he was at once made speaker. Here he became prominent as an advocate of war and from his official position practically forced the War of 1812 upon the country. He acted as one of the American commissioners in the peace negotiations in 1814.

Clay was continuously reëlected Speaker of the House until his retirement in 1821. Again he occupied that post when reëlected to Congress in 1823. During his career in the House his most important act was doubtless the introduction of the famous Missouri Compromise of 1820 (see Missouri Compromise). In 1824 he was an unsuccessful candidate for the Presidency against Crawford, Jackson and John Quincy Adams. No candidate had a majority of the electoral vote, and the contest was therefore sent to the House of Representatives, where Clay, being fourth in the list, was ineligible for election. He transferred his strength to Adams, and upon the latter's election Clay was appointed Secretary of State. This fact gave the basis for the charge of corruption between Adams and Clay, which, though unfounded, was used to the latter's political injury throughout his career. As chief of Adams' Cabinet he displayed considerable ability, but he lost his prestige in Congress through absence, and never regained it.

Clay was again elected to the Senate in 1831, became a bitter opponent of President Jackson, and was his competitor in the election of 1832, but was defeated. He again became conspicuous as pacificator in the nullification controversy of 1833, when, by his compromise tariff measure, he probably prevented a resort to arms. Throughout the rest of his career, Clay was one of the foremost orators in America, and though unsuccessful in his great ambition to become President, he was an acknowledged leader of the Whig party. He retired from the Senate in 1842, was defeated for President by Polk in 1844 and was defeated for the nomination by Taylor in 1848, but in the same year he was reëlected to the Senate. From this time forward he devoted his efforts to allaying the sectional strife upon the slavery question, and he made his last great speech in the Senate in support of the Compromise of 1850. Though a man of strong convictions, Clay often sacrificed popular favor by seeking to win the support of all sections and factions, and thus gained the reputation of being vacillating and even insincere.

CLAYTON-BULWER TREATY, a treaty between Great Britain and the United States, concluded in 1850, by which both parties agreed to guarantee the neutrality of a canal through Central America, but not to exercise any control over the territory nor to erect any fortifications there. It was at this time that the Nicaragua Canal was proposed (see Nicaragua Canal). The United States made several attempts to have this treaty modified or abrogated, but the British government refused to concur, until 1901, when the Clayton-Bulwer Treaty was abrogated (see Hay-Pauncefote Treaty). The negotiators were Secretary of State John M. Clayton, for the United States, and Sir Henry Bulwer, special ambassador, for Great Britain.

CLEARING HOUSE, a term which has become almost exclusively associated with the management of banks in large cities, but which, in a broad sense, means a place where the claims of several parties, regardless of the nature of their business, are adjusted.

In connection with the banking business the methods employed in a clearing house amply justify the title. In it all debits and

credits of the various member banks are "cleared" every day with minimum effort and slight expenditure of time.

How It is Conducted. Each member bank sends to a central office, which they call the clearing house, two representatives—a so-called delivery clerk and a settling clerk. In a large room each bank is assigned a desk. Upon arrival at the clearing house, usually about 11 A. M., the clerks from each bank deposit at the manager's table a ticket showing the aggregate amount due to them from other banks, as shown by checks which these clerks have brought with them. The manager enters this sum to the credit of the bank presenting the ticket. The checks which each set of clerks have brought with them are divided into bundles, each of which contain checks upon some other one bank. At a given signal the settling clerks seat themselves at their respective desks and the delivery clerks pass among them, delivering to each settling clerk bundles of checks drawn on the bank which he represents. When each settling clerk has received all the bundles of checks drawn against his bank he draws up a statement of the demands made upon him. The lists of all the settling clerks are then sent to the manager, who draws up a statement showing the amount which each bank owes to each of the other banks in the association. The checks against the banks are then returned to the banks by their respective clerks; the separate items are approved, and the debtor banks must pay to the creditor banks the amounts due.

If the clearing house did not exist, each bank would have to send its messengers directly to all other banks to settle balances; the cost would be excessive, for many hours daily would be required. Time would not permit the use of the mails to make the daily clearings.

The clearings of the banks in large cities reach enormous proportions. The total for New York for 1917 was $181,534,031,000, an average of $601,106,000 per day. Chicago was second, with $24,452,469,000; Philadelphia was third; Boston, fourth; Kansas City, fifth; Saint Louis, sixth. Before the World War centered vast business interests in New York City the clearings were about half of the 1917 total.

CLEAVAGE, *kle'vaj*, the manner or direction in which crystallized substances regularly split. The regular structure of most crystallized bodies becomes manifest as soon as they are broken. Each fragment presents the form of a small polyhedron, and the very dust appears under the microscope an assemblage of minute solids, formed according to some plan of crystallization. The directions in which such bodies thus break up are called their *planes of cleavage.* See CRYSTALLOGRAPHY; METAMORPHISM; STRATIFIED ROCKS.

CLE'BURNE, TEXAS, the county seat of Johnson County, fifty-five miles southwest of Dallas, on the Gulf, Colorado & Santa Fé, the Missouri, Kansas & Texas and Trinity and Brazos Valley railroads. The city has a large trade with the surrounding agricultural region. It contains cotton compresses, oil mills, flour mills, foundries, machine shops and division offices and shops of the Santa Fé and T. & B. V. railroads. Population in 1910, 10,364; in 1917, 12,553 (Federal estimate).

CLEMATIS, *klem'a tis*, a genus of woody, climbing plants. The most common species, virgin's bower or traveler's joy, is conspicuous in the hedges both of England and the south of Scotland, first by its copious clusters of white blossoms and afterward by its feather-tailed, silky tufts attached to the fruits. There are about one hundred species of clematis, most of which are found in temperate climates. In North America about twenty species grow well. The most common of these is the virgin's bower, which resembles the European clematis both in its color and in its feathery pistils. A rarer species, found in a few locations, has large, single, purplish drooping flowers.

CLEMENCEAU, *kla mahn so'*, GEORGES BENJAMIN EUGENE (1841–), a French statesman and journalist of radical views, called the "Tiger" because of his dauntless courage and fighting powers. For nearly half a century a storm center of French politics, he dominated the situation at the most critical period of the World War, and by rescuing his country from pacifist and enemy intrigues proved himself the "strong man" of France. Clemenceau was educated to be a physician, and in the early part of his career he spent several years in the United States, teaching and practicing medicine. While in America he married an American woman. Returning to France shortly before the outbreak of the Franco-

German War, he was elected mayor of the district of Marte in Paris, and in 1876 was chosen a Republican Deputy in the French Parliament. In that body his independence of action and vigor of speech made him a prominent figure nationally, and his reputation was further enhanced by his radical editorials in *La Justice,* a daily paper which he founded in 1880.

Clemenceau lost his seat in the Chamber of Deputies in 1893, and for about ten years labored for justice and democracy with a trenchant pen. He was one of the strongest leaders in the movement in behalf of Captain Dreyfus, founding a new paper, *L'Aurore* ("The Dawn"), to champion the cause of that wronged officer. In 1902, at the age of sixty-one, he was elected to the national Senate, from the department of Var, in 1906 was appointed Minister of the Interior and in 1906 was made Premier of France. Though his Ministry was defeated in 1909, Clemenceau continued to be a power in politics, and in 1913 he was instrumental in overturning the Briand Ministry. He also became editor of a radical paper, *L'Homme Libre* ("The Free Man"), in which, during the World War, he unsparingly criticized the government for its vacillation and weakness.

In October, 1917, when the cause of the allies seemed in danger of disaster, Clemenceau was again called to head the Cabinet. Traitors were brought to trial, intrigues were crushed, and the nation's weakened morale was strengthened. The manner in which the people rallied and the army fought its way to victory in 1918 is told in these volumes in the article WORLD WAR.

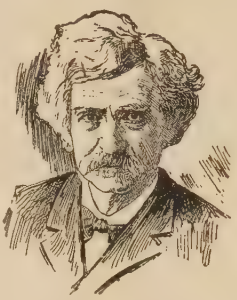
It is a remarkable thing that Clemenceau should have been Premier of France when Germany surrendered. After the Franco-German War he had signed a manifesto against the cession of Alsace-Lorraine, and at the close of the World War he said, "The redemption of Alsace-Lorraine has been the goal of my life." At the peace conference which began sittings in January, 1919, the aged Premier was made chairman. In January, 1920, he was a passive candidate for the Presidency of France, but was defeated by Deschanel. He then passed into well-earned retirement. Notwithstanding his great age he published in 1919 *The Strongest.*

Clemenceau is not a Socialist, but he believes in radical social legislation and government ownership of monopolies. He represents that versatility characteristic of nearly all French intellectuals, and is not only a political leader but a novelist, dramatist, philosopher and essayist.

Huckleberry Finn

CLEMENS, *klem'enz,* SAMUEL LANGHORNE (1835–1910), best known as MARK TWAIN, was probably America's most beloved humorist. His writings have delighted old and young for a generation, and are continuing in their popularity. Clemens was born at Florida, a little hamlet in Northeastern Missouri, about fifty miles west of the Mississippi, November 30, 1835. His early education consisted of the limited training he could then get in this small country town and at thirteen years of age he entered a printing office. After becoming an expert compositor he worked for short periods of time in Saint Louis, Philadelphia, New York and other places. In 1851 he gave up his work in printing offices and went on a Mississippi steamboat as apprentice, where in 1857 he became a pilot. Here he met with a great variety of experiences which later he used to much advantage in writing the series of highly entertaining chapters, which now make his book *Life on the Mississippi.* Here, too, he must have originated his pen name, for "By the mark, twain" was the cry used by the man who sounded the depth of the water to tell the pilot that it was two fathoms deep. It is said that Captain Isaac Sellers had signed articles *Mark Twain* in the New Orleans *Picayune* previous to the time Clemens assumed the name, but it now belongs completely to the latter and thousands upon thousands of readers know the genial humorist by no other. When the Civil War broke out navigation on the Mississippi ceased and Mr. Clemens lost his occupation as pilot. For some little time he was a member of a company of Confederate sympathizers organized near his home, but he never was engaged in active war service. About this time his brother had been appointed Territorial Secretary of Nevada and Mr. Clemens went

out with him to Nevada City, where for a time he was interested in mining. In 1862, however, he became a reporter for a Virginia City paper, and several years later he removed to California, where he was a reporter for the *Morning Call*. In 1866 he went to the Sandwich Islands, and upon his return began his career as lecturer, attracting considerable attention. The publication in 1867 of the *Jumping Frog of Calaveras County* increased his reputation, and *Innocents Abroad*, an account of an excursion through Egypt and the Holy Land, won him international fame. In 1870 he married, and after editing for two years the *Buffalo Express*, settled in Hartford, Conn. He joined a publishing firm of New York in 1884, but after a few years of success the firm became bankrupt, and Clemens, to meet his heavy losses, traveled as a lecturer, meeting with the greatest success. For some years after 1890 he lived in Europe.



SAMUEL L. CLEMENS

Besides the works mentioned above, Clemens is noted chiefly for his *A Connecticut Yankee at King Arthur's Court, Pudd'nhead Wilson, The Prince and the Pauper,* the *Adventures of Tom Sawyer* and the *Adventures of Huckleberry Finn.* The last two, especially, are of their kind unrivaled, not only because they are full of Clemens's genial humor, but because they give truthful, vivid pictures of the free life of a boy along the Mississippi River.

CLEMENT, *klem'ent,* the name of fourteen Popes, of whom the following are of greatest importance:

Clement I, reputed to have been the third bishop of Rome after Peter, lived in the first century A. D. He was greatly venerated in his day, and a letter which he addressed to the Church of Corinth was at one time regarded as a part of the Bible.

Clement VII, a member of the Medici family, occupied the Papal chair from 1523 to 1534. He was the Pope who refused to recognize Henry VIII's divorce of Catharine of Aragon.

Clement VIII, a man of great piety and learning, was Pope from 1592 to 1605. He helped to bring about a reconcilation between France and Spain, and smoothed out the controversy between Henry IV of France and the Church.

Clement XIV, Pope from 1769 to 1774, founded the Clementine Museum in the Vatican. He was a zealous supporter of the Jesuits, but because of this attitude he aroused opposition in many countries. He was the last of the Popes to bear the name Clement.

CLEOPATRA, *kle o pa'tra,* a Greek queen of Egypt, distinguished as CLEOPATRA VI from others who bore the name. She was one of the most famous of all the rulers that have ever lived; not because she was crowned with virtues that made her beloved of her people, or for great monuments to her genius or for strength of character which inspired the nation, for she is not known for any of these qualities. She was a queen of great personal attraction, but lacked the quality of wondrous beauty possessed by some famous women of history. Against her blandishments no man except Augustus was able to stand; she led the greatest according to her fancy. Pascal, who lived from 1623 to 1662, said of her, "If the nose of Cleopatra had been shorter, the whole face of the earth would have been changed."

When she was seventeen years old her father died, leaving her as joint heir to the throne with his eldest son, Ptolemy; when she was deprived of her part in the government she won Caesar to her cause and was reinstated by his influence. In a second disturbance Ptolemy lost his life, and Caesar proclaimed Cleopatra queen of Egypt, though she was compelled to take her brother, the younger Ptolemy, as colleague. Caesar continued some time at Cleopatra's court. By poisoning her brother, she became sole possessor of the regal power, took the part of the triumvirs in the civil war at Rome and after the Battle of Philippi went to do homage to Antony at Tarsus. Their meeting was celebrated by splendid festivities; she accompanied him to Tyre and was followed by him on her return to Egypt. After his conquest of Armenia he again returned to her. On the commencement of the war between Augustus and Antony, the latter lost a whole year in festivals and amusements with Cleopatra at Ephesus, Samos and Athens, and when at last the fleets met at Actium, Cleopatra suddenly took to flight, with all her ships, and Antony immediately followed her. Augustus advanced on Alexandria and proved himself proof against Cleopatra's remarkable fascinations. Believing Cleopatra to be dead, Antony threw himself on his sword, and shortly afterward

Cleopatra killed herself, by applying an asp to her arm, to escape the ignonimy of being led in a Roman triumph. Such is the traditional account of her death.

Cleopatra bore a son to Caesar, who was called Caesarion. She bore three children to Antony. In A. D. 40 the Ptolemy line became extinct through the slaying of the last of Cleopatra's descendants by the Emperor Caligula.

She has been given a romantic setting through the centuries, for writers and artists have found in her person and career abundant material with which to create an atmosphere of profound interest.

CLEOPATRA'S NEEDLES, the name given to two Egyptian obelisks, formerly at Alexandria; one of them is now in New York, the other in London. They are made of rose-red granite and were originally erected by Thothmes III in Heliopolis, being dedicated to the god Ra, or the Sun. They were taken to Alexandria shortly before the commencement of the Christian Era and remained there until 1877, when they were presented to Great Britain and the United States by the Khedive Ismail Pasha.

CLEOPATRA'S NEEDLE
In Central Park
New York.

The New York obelisk is sixty-nine feet high and weighs 200 tons. The sides are covered with inscriptions of Thothmes III and Rameses II. In the dry and hot air of Egypt the obelisks stood undamaged for 3,000 years, but in the atmosphere of New York and London they began to disintegrate. A preservative fortunately has been found to apply to the stone.

CLEVELAND, Stephen Grover (1837–1908), an American statesman and President, the only chief executive of the United States who has served two terms not in succession. His career as President was not always calm; he antagonized his own party on numerous occasions, and history has justified his course. After leaving office his strength with the people steadily increased, and at his death he was ranked as one of the greatest figures of his time.

Cleveland was born in Caldwell, N. J. The death of his father, a Presbyterian clergyman, compelled young Cleveland to earn his own living, and he became a clerk and assistant teacher in the New York institution for the blind. In 1855 he started west, but stopped at Buffalo, where he was admitted to the bar in 1859. In 1863 he became assistant district attorney of Erie County, and he was made sheriff in 1870. In 1881 he was elected mayor of Buffalo on the Democratic ticket, though the city was strongly Republican, and his efficient administration led to his nomination and election as governor of the state by a remarkable plurality. His career as governor was marked by exceptional ability, fearlessness and honesty. He was nominated for President at the national Democratic convention held in Chicago in 1884, and was elected over Blaine, Republican, by a small plurality.

GROVER CLEVELAND

As President he made extraordinary use of the veto power to curb unworthy legislation, especially private pension bills, and boldly advocated a reduction in the tariff. In 1888 he was again Democratic candidate for President, but he was defeated by the Republican candidate, Benjamin Harrison. He then removed to New York and practiced law. On June 2, 1886, he had married, at the White

First Administration of Grover Cleveland

I. The President
- (1) Birth
- (2) Parentage
- (3) Education
- (4) Public career
- (5) Character
- (6) Death

II. Governmental Affairs
- (1) Important laws
  - (a) Contract labor law
  - (b) Act in regard to the Presidential succession, 1886
  - (c) New Anti-polygamy Act
  - (d) Chinese Exclusion Act
  - (e) Rivers and Harbors Bill
  - (f) Interstate Commerce Act,
    - (1) Causes
      - (a) Granger movement
      - (b) Discrimination by railroads
        - (1) Rates
        - (2) Facilities
      - (c) Growing power of railroads over other industries
    - (2) Its provisions
      - (a) Forbade pooling
      - (b) Discrimination and rebates illegal
      - (c) Required publicity of rates
      - (d) Higher charge for short haul than for a long haul illegal
      - (e) Established commission to investigate and to punish offenders
  - (g) Electoral Count Act
    - (1) To avoid contested elections
  - (h) Repeal of the Tenure of Office Act
- (2) Other affairs
  - (a) The attempt to reduce the tariff
    - (1) Mills' Bill
  - (b) President's use of the veto
    - (1) Vetoed more bills than any previous President
    - (2) Mostly private pension bills
  - (c) Department of Agriculture established

III. Local and Internal Affairs
- (1) Dedication of the Statue of Liberty
- (2) Organization of the American Federation of Labor
- (3) Deaths of many prominent men
  - (a) Grant
  - (b) McClellan
  - (c) Hancock
  - (d) Tilden
  - (e) Logan
  - (f) Sheridan
  - (g) Conkling
  - (h) Arthur
- (4) Haymarket Riot, 1886
- (5) Charleston Earthquake, 1886

IV. Election of 1888
- (1) Candidates
- (2) Tariff the issue

Questions

Where was Grover Cleveland born?

How old was he when he became President?

What public offices had he held?

What was the Contract Labor Law?

When was the act regarding the succession to the presidency passed?

Who stands next in order to the Vice-President?

What were the provisions of the new Anti-polygamy Act?

What were some of the causes of the Interstate Commerce Act?

What did the law provide?

What was decided by the Electoral Count Act?

What executive department was established during this administration?

What great statue was dedicated in 1886?

What great labor organization was founded in 1887?

Second Administration of Grover Cleveland

I. The Panic of 1893
- (1) Causes
  - (a) Agricultural depression
  - (b) Reckless financiering
  - (c) Speculation in Argentine securities
  - (d) Financial crisis in Europe
- (2) Incidents
  - (a) Currency at a premium
  - (b) Clearing House Certificates issued
  - (c) Bank and commercial failures
  - (d) 22,000 miles of railway in hands of receivers
- (3) Results
  - (a) Industrial chaos
    - (1) Depression and inactivity in business
    - (2) Strikes and lock-outs
      - (a) Caused by reduction of wages or no work
        - (1) Caused by closing of the Pullman shops
        - (2) Rioting and destruction of property
        - (3) Governor Altgeld of Illinois refused to call out militia
        - (4) President Cleveland sends Federal troops to protect the mails
  - (b) Repeal of the Silver Purchase Act
  - (c) Sale of gold bonds

II. Governmental Affairs
- (1) Domestic
  - (a) Wilson-Gorman Tariff Act
    - (1) Originally a Democratic measure
    - (2) Changed in the Senate
    - (3) Allowed to become law without the President's signature
  - (b) Income Tax
  - (c) Admission of Utah, 1896
  - (d) Extension of Civil Service
- (2) Foreign
  - (a) Hawaii
    - (1) President withdrew treaty of annexation from Senate
    - (2) Appointed special commissioner to investigate
  - (b) Bering Sea controversy settled
  - (c) Treaty with China
    - (1) Beginning of the "open-door" policy
    - (2) Integrity of China guaranteed
  - (d) President acts as arbitrator
    - (1) Between Brazil and Argentine Republic
    - (2) Colombia and Italy
    - (3) Brazil and Italy
  - (e) Venezuela dispute

III. Local and Internal Affairs
- (1) World's Columbian Exposition
- (2) Colorado grants suffrage to women

IV. Election of 1896
- (1) Candidates
- (2) Issues
- (3) Result

Questions

What were the causes of the great railway strike?

On what grounds did the President send Federal troops to Chicago?

Explain why the panic necessitated the repeal of the Silver Purchase Act.

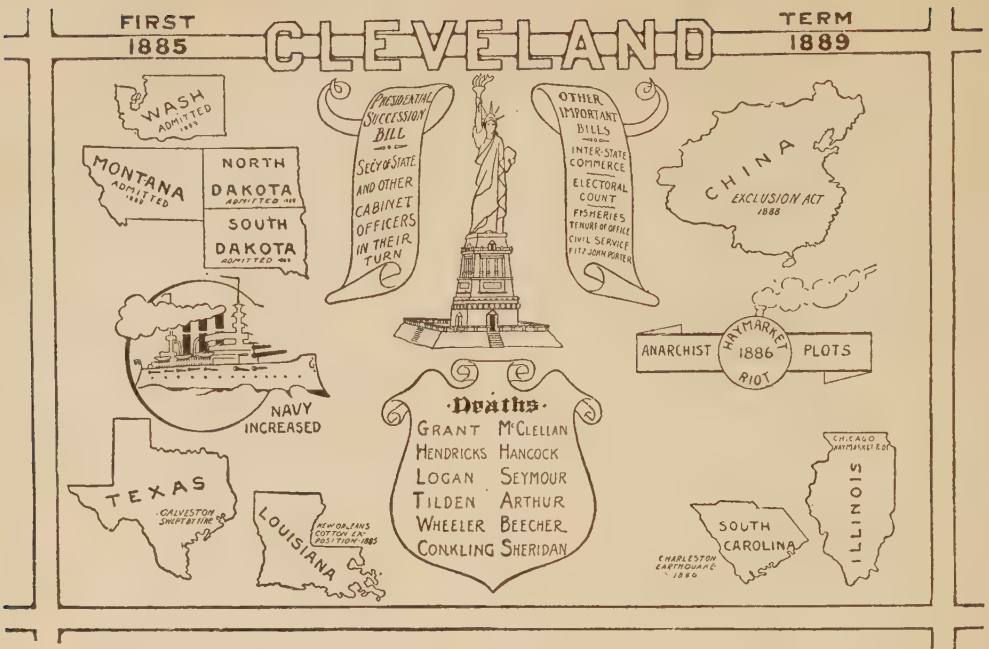
What is an income tax?

What state was admitted in 1896?

When was the Bering Sea controversy settled?

What was the President's attitude toward the annexation of Hawaii?

What event did it commemorate?



House, Miss Frances Folsom, daughter of his former law partner. He was again nominated by his party for President in 1892, in spite of opposition from his own state, and was elected. His second term was memorable because of a financial panic, which he strove to avert by the repeal of the Sherman silver purchase law and by the issue of government bonds for the replenishment of the treasury's gold reserve; for the passage of the Wilson tariff law, which, though reducing some duties, was deemed so ineffectual by the

President that he would not sign it, and for the notable message from the President to Congress, in accordance with which steps were taken to compel England to arbitrate her controversy with Venezuela.

After his retirement from the Presidency, Mr. Cleveland did not reënter public life. When insurance scandals were disclosed in New York state Cleveland was called as a trustee for vast insurance interests, and his acceptance of the trust created a feeling of confidence that was a splendid tribute to him. He delivered each year a series of lectures in Princeton University, was elected a trustee of the University soon after his retirement from the Presidency, and took an active interest in its affairs. The tower of the new graduate school of Princeton is called the Cleveland Memorial Tower, in his honor.

Mrs. Cleveland, the former White House bride, was married in 1913 to Professor Thomas J. Preston, Jr., of Princeton University.

CLEVELAND, *kleev'land*, Ohio, the county seat of Cuyahoga County, and second largest port of the Great Lakes, is situated on Lake Erie at the mouth of the Cuyahoga River, 183 miles southwest of Buffalo, 263 miles northeast of Cincinnati and 357 miles southeast of Chicago. Cleveland is the metropolis of Ohio and the sixth largest city of the United States, with a population of 560,663 in 1910. In 1917, according to a Federal estimate, this had increased to 692,259.

General Description. The city is built upon slightly rising ground which is 689 feet above sea level, and extends along the lake front for a distance of twelve miles; its greatest extent inland is about six miles, and its area is 51.8 square miles. The Cuyahoga River divides the city into two unequal parts, the eastern and the western, the latter and smaller of which is known as West Cleveland. This stream flows through a deep and somewhat broad valley, whose surface is considerably below the remaining portions of the city, and this valley is occupied by freight depots, factories and lumber yards. The stream and valley are crossed by two noted bridges, one of which, the Superior Avenue Viaduct, cost $2,250,000. The streets are broad and well paved, and many of them are shaded with maples and elms, which add to the beauty of the city and have given it the name *Forest City*. From Monumental Park, or the Public Square, the streets extend in all directions, but the longest thoroughfares in the lower part of the city are parallel to the lake shore, while farther inland they are nearly east and west. Crossing these are streets extending from the lake to the southern portion of the city. In nearly all sections the streets cross at right angles.

Parks and Boulevards. Of the many beautiful streets of the city, the finest is Euclid Avenue, a boulevard extending eastward from the Public Square. It is from eighty-three to ninety feet in width, and is lined with beautiful homes surrounded by spacious lawns. Of late years the lower part of this boulevard has been rendered less attractive by the encroachment of the business section. Other attractive thoroughfares include Lake Shore, East and Clifton boulevards, Magnolia Drive, Bellflower Road and Juniper Drive. The total park area of Cleveland is over 2,670 acres. Rockefeller Park, of 273 acres, is a long, narrow stretch of green connecting Wade and Gordon parks, the former overlooking the lake, and the latter situated at the mouth of Doan Brook, which flows into the lake. Rockefeller Park occupies the valley of the Doan, and was presented to the city by John D. Rockefeller. Wade Park possesses a zoölogical garden and a splendid monument to Perry, hero of the battle of Lake Erie. Among other parks are Newberry, Forest City, Brookside, Lincoln, Garfield and Woodland Hills.

Mention should be made of beautiful Lakeview Cemetery, notable as the burial place of President Garfield. His body lies in a crypt beneath a splendid memorial, worthy to be compared with the tomb of General Grant, in New York. This structure, 165 feet high, is of Ohio sandstone and contains in relief sculptures representing incidents in Garfield's life. The interior is in the form of a chapel decorated with symbolical friezes and containing a marble statue of Garfield in the center. The monument cost about $130,000.

Public Buildings. The principal public edifices of Cleveland are being grouped about a central plot of ground, in accordance with a "city beautiful" plan submitted by a commission which included Daniel H. Burnham. When completed the group will consist of the Federal building, courthouse, city hall, public library building, museum and union passenger station, all representing the finest ideals of modern architecture. At each end of the plot will be erected an imposing Court of Honor to connect the buildings. Cleveland is also noted for its many arcades, buildings erected about a central court with tiers of stores and offices having balcony fronts. Among other buildings of special note are the Chamber of Commerce, Art Museum, the building of the Brotherhood of Locomotive Engineers and Western Reserve Historical Society Building. There are nearly 400 churches, some of imposing architecture, and a number of handsome hotels.

Institutions. Cleveland was one of the first American cities to establish a free high school, and its public school system has kept pace with the development along other lines. There are besides, numerous private, parochial and business schools, and several colleges and universities. These latter include Western Reserve University (which see), with its departments of Adelbert College, Women's College and various professional schools; Baldwin University, the University School, Saint Mary's Theological Seminary and many professional schools. The public library has 350,000 volumes, and there are besides, various college, law and historical libraries. Cleveland has all the charitable and benevolent institutions of a city of its rank, including the Boys' Farm, Goodrich House and the Mouth Hygiene Association.

Commerce and Industry. Among the Great Lakes ports Cleveland ranks next to Chicago in amount of freight tonnage entering and clearing its harbor, and it is also an important railway center, being served by the Cleveland, Cincinnati, Chicago & Saint Louis, the Baltimore & Ohio, the Erie, the New York Central, the New York, Chicago & Saint Louis, the Pennsylvania and the Wheeling & Lake Erie roads. The natural harbor at the mouth of the Cuyahoga has been improved by dredging operations and the construction of a huge breakwater, and a ship-channel 200 feet wide has been formed by the building of two parallel piers which extend out into the lake for a distance of 1,500 feet. The city has eighteen miles of river frontage and over five miles of docks.

As a manufacturing center Cleveland ranks first in the state, second among the cities on the Great Lakes, and fifth among those of the entire country. The iron and steel industries have been especially developed because of the city's location between the coal, iron and oil regions of Western Pennsylvania and the Lake Superior iron and copper-ore districts. In the manufacture of steel ships, wire, bolts, nuts, machinery, etc., it is among the leading cities in the United States, and in the production of women's suits and coats it is surpassed only by New York. Cleveland is also the largest fresh-water fish market in the country, a center for the manufacture of automobiles, and an important grain, lumber and petroleum center. Other important industries include slaughtering and meat packing, oil refining and the manufacture of electrical apparatus.

History. The first settlement on the site of Cleveland was made by a party of surveyors under Moses Cleaveland, whose name was given to the new town, the present spelling being officially adopted in 1831. In 1809 Cleveland became the county seat of Trumbull County, which had been organized in 1800, but in 1814 it was incorporated as a town of Cuyahoga County, a subdivision of the original county. By 1820 the town had a population of 600, and boasted a bank and a newspaper. After the completion of the Ohio Canal the place grew rapidly, and in 1836 received a city charter. The city has been the home of a number of prominent men, among them President Garfield, John Hay, Marcus A. Hanna and John D. Rockefeller.

CLICK BEETLE, SPRINGING BEETLE and **SKIP JACK**, names given to a family of beetles because of their peculiar behavior. If the click beetle is touched or alarmed, he folds up his legs and feigns death. If placed upon his back, he will lie quietly for a moment, and then by a sudden jerking motion, accompanied by a clicking sound, he will throw himself some little distance in the air, and, landing on his feet, will run away. There are about 500 species of click beetles in North America alone. The largest and most conspicuous is the *eyed elater*, which is grayish-black in color and has two

large black spots, like eyes, on the sides of its thorax. These beetles usually live singly in flowers, grass and decaying wood. The destructive larvae are known as *wireworms*. Some of the tropical click beetles are luminous, and one species carries two glowing spots on each side of its thorax. These beetles are sometimes worn as ornaments.

CLIFF DWELLERS, one of the very earliest of American races, who left the evidences of their existence in the homes they built and inhabited in cliffs and rocks. They preceded the Pueblo Indians in the southwestern part of what is now the United States, in New Mexico and Arizona.

The cave dwellings were frequently built at the cost of great labor, and were closed and strengthened by stone walls, while their cliff houses were veritable fortresses, to which the inhabitants retreated when menaced by serious danger. Any situation pleased them, provided it gave hope of security. These dwellings have even been found hollowed in layers of volcanic ashes, hardened by time, while all around, pieces of cut silex and fragments of pottery attest the long sojourn of the people. One "cliff palace" had a length of 421 feet, contained 127 rooms, capable of affording shelter to 1,500 persons. The dwellings were constructed either of assorted stones, held together with moistened clay, or of adobe or sun-dried bricks. The circular ruins contain a number of small cells, and a building, often half-subterranean in the center, which the Spaniards called an *estufa*. Some contend that these *estufas* were the council chambers, where the principal men of the tribe assembled; while others hold that they were meant to keep the sacred fire, which is even to-day an object of veneration with the Indians. Sometimes the homes of the Cliff Dwellers were at a great altitude, being as high as 800 feet above the level of a river.

The entire San Juan valley is strewn with the ruins. There is one long, narrow structure running in front of a cave 200 feet wide at the mouth, where windows eighteen inches square are the only means of entrance. Recent explorations have brought to light a small number of mummies in a fair state of preservation. Side by side with the bodies, weapons, utensils and ornaments were found. Agriculture seems to have been more perfect among the inhabitants of Arizona than among those of New Mexico.

CLIMATE, the average condition of the atmosphere, with respect to temperature, humidity, rainfall, wind and storms. Weather is the atmospheric condition for a short period of time, as a day or a week, but climate is the condition of weather for a long period of years. Weather is constantly changing; but there have been no marked changes of climate for many centuries.

The chief determining factors of climate are latitude, altitude, the inclination of the earth's axis to the plane of its orbit, distance from the sea and prevailing winds. Of all these, latitude is the most important factor, since upon it, more than upon any other cause, depends the temperature of a region, which is the most important climatic feature. The temperature is the highest in the equatorial regions and gradually diminishes toward the poles. Were the surface of the earth prefectly smooth, there would be little or no variation in temperature for places having the same latitude; but the general effect produced by the different angles at which the sun's rays strike the earth between the equator and the poles is modified by numerous local conditions. Chief among these is altitude, and this, next to latitude, is the most important agency that affects climate. The average temperature of a place falls one degree for every 300 feet in ascent above sea level. In other words, 300 feet in altitude will produce the same variation in temperature as from thirty to sixty miles in latitude, according to the location of the place. Hence in the mountainous regions of the tropics are all grades of climate from that of the torrid zone to that of the arctic regions.

Water is a great equalizer of temperature. It warms and cools much more slowly than the land. Hence, regions located in the vicinity of large bodies of water, such as those on the sea coast or near the Great Lakes, have a more equable temperature than those situated far inland. Winds blowing over the oceans acquire the same temperature as the water. Hence in the temperate

regions countries situated on the western coasts of the continents usually have a warmer climate than those on the eastern coasts in the same latitude, since the general direction of the winds is westerly. This is seen very clearly in comparing the temperature of places having the same latitude on the eastern and western coasts of North America. In each instance the higher temperature on the western coast is due to the prevailing westerly winds which have been warmed by blowing a long distance over warm marine currents. A similar contrast exists between the eastern coast of North America and the western coast of Europe.

Mountain ranges influence rainfall and winds; hence, they are important factors in determining the climate of certain localities, as that of the Great Central Plain in North America. This region is situated between the Appalachian Mountains on the east and the Rocky Mountains on the west. The prevailing winds are from the north or the south; hence, all of the interior of North America is subject to sudden changes of temperature, since the north wind causes a fall and the south wind a rise in temperature. In Europe the comparatively low western coast allows the warm winds from the Atlantic to blow over a large area; hence, that portion of the continent, though far north, has a comparatively warm climate. The Alps form a barrier which prevents these winds from blowing over the countries to the south, so that these countries are wholly under the influence of the warm winds blowing across the Mediterranean; hence, Spain and Italy have a warmer climate than portions of the United States in the same latitude.

Climate is the chief factor in determining the animal and vegetable life and the character of civilization of any locality. While the largest land animals and the most luxuriant vegetation are found in the tropics, it is within the temperate regions that the most intelligent and useful of the lower animals and the most valuable plants have developed. It is also within the north temperate region that the great nations of civilization have originated and reached their highest stage of enlightenment. See Meteorology; Weather Bureau.

CLINTON, DeWitt (1769–1828), a leading statesman of his time and one of the most famous of the governors of New York, whose name is inseparably connected with the construction of the Erie Canal. He was born in Connecticut, but was educated for the law in New York and in that state he made his home. Clinton was admitted to the bar in 1788, in 1797 was elected to the legislature, the next year was a member of the senate of the state of New York and in 1801 was elected United States Senator. For twelve years, with two short intervals, he was mayor of New York. He was again member of the senate of New York from 1803 to 1811, and was lieutenant-governor of the state for two years. In 1812 he was defeated by Madison for President of the United States. In 1817 he was chosen governor of the state and was reëlected three times. During his third term, in 1825, he officiated at the opening of the Erie Canal, thus witnessing the completion of a work to whose promotion he had devoted the best years of his life, and with which his name will be inseparably connected. See Erie Canal; New York State Barge Canal.

DeWitt Clinton

CLINTON, George (1739–1812), an American soldier, statesman and Vice-President of the United States. He served in the last French and Indian war, in 1775 was a delegate to the Continental Congress and was appointed a brigadier-general in the Continental army in 1777. He was the first governor of the State of New York, serving from 1777 till 1795 with exceptional ability. Clinton was of great service to the colonial cause, through his influence over the Indians. He opposed the Federal Constitution on account of its centralization of power. He was again chosen governor in 1801, and three years later was elected Vice-President, which office he held until his death.

CLINTON, Henry, Sir (about 1738–1795), a British major-general who arrived in Boston in 1775. He served at Bunker Hill, was second in command in the movements that compelled the Americans to evacuate New York in September, 1775, and was left in command of that city in the summer of

1777. He stormed Forts Clinton and Montgomery, and was appointed commander in chief of His Majesty's forces in America, with the rank of lieutenant-general. In June, 1778, he evacuated Philadelphia, and on his retreat through New Jersey he fought with Washington at Monmouth. He went to South Carolina in December, 1779, and captured Charleston in the spring of the following year. In October, 1781, he set sail for Chesapeake Bay with a large force to aid Lord Cornwallis, but learned that Cornwallis had surrendered, and thereupon he returned to New York. In June, 1782, he returned to England.

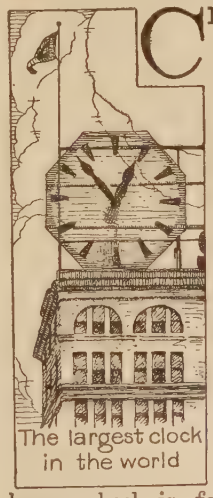
CLINTON, Iowa, founded in 1835 and named for DeWitt Clinton, is the county seat of Clinton County, located on the Mississippi River, 138 miles west of Chicago, on the main line of the Chicago & North Western and on the Chicago, Milwaukee & Saint Paul, the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific railroads. The North Western machine shops are located here, and that road also maintains large stockyards. The manufactures include sugar refining, lumber, sash, doors and blinds, locks, machinery, wagons, overalls, furniture and other articles. Wartburg College, Mount Saint Clare Academy and Our Lady of Angels Seminary are located here. Population in 1910, 25,577; in 1917, 27,678 (Federal estimate).

CLISTHENES, *klis'the neez*, an Athenian statesman who lived about 500 B. C. He belonged to a notable family, and in early manhood acquired great influence. It was Clisthenes who prevailed upon Athens to adopt ostracism (which see), and the city later turning against him applied it to himself. His great service to his country was in the nature of reforms in the constitution, making it more democratic.

CLIVE, Robert, Baron of Plassey (1725–1774), an English general and statesman, and one of the greatest Britons in Indian history. He went to India as a clerk in the service of the East India Company, and when in 1747 war broke out in India between the French and English he joined the army. By his capture of Arcot and his defense of it against a greatly superior force of French and natives in 1751, he won a very favorable reputation, and this was heightened by his future successes over the French. In 1753 he sailed to England to recover his health, and he was received most cordially.

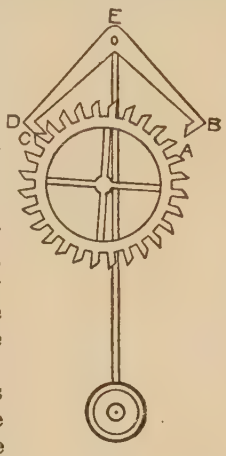
Two years later he was back in India, and he was in the same year placed in command of the expedition sent to Bengal. He took Calcutta and defeated the nawab of Bengal in a battle at Plassey, thus establishing English supremacy in India. He placed on the throne of Bengal a general of the defeated nawab, and through him he became possessed of great wealth. On his second return to England in 1760 he was accorded many honors, but he was sent back to India to straighten out the affairs of the East India Company. This he accomplished in about eighteen months. Returning to England, he was met with the accusation of having abused his power to gain wealth, and an investigation was made. His complete acquittal followed, but the disgrace of the accusation so preyed upon his mind that he committed suicide.

CLOA'CA MAX'IMA, the great sewer at Rome, built about 2,500 years ago. A portion of it is still in use, and it may be seen under the Roman Forum and where it empties into the Tiber. It is about thirteen feet in width and depth.


The largest clock in the world

CLOCK, a machine for recording the flight of time, measuring it in intervals of hours, minutes and seconds. It is a comparatively simple device; the necessary parts being a weight or spring, which furnishes the motive power; an escapement, which is connected with the pendulum or balance wheel; a train of wheels; a dial, and hands. The weight is attached to a cord, which is wound around a drum, to one end of which a large wheel is fastened. As the weight descends, the unwinding of the cord imparts motion to the train of wheels. The motion is regulated by a pendulum, which is connected with the escapement wheel, as shown in the illustration. As the top of the pendulum swings to the right, the tooth *A* of the escapement wheel escapes from the pallet *B*, while the tooth *C* is brought

against the pallet *D*. The ends of these pallets are so shaped that as the teeth of the escapement wheel are released by them, sufficient force is imparted to the pendulum to keep it swinging. The pinion of the escapement connects with cogs, usually called *leaves*, on a larger wheel, whose pinion connects with another large wheel, and so on until the necessary number of wheels is used to produce a rotation, once in twelve hours, of the wheel which carries the hour hand. Another wheel, carrying the minute hand, makes a complete rotation once an hour. The movement of the wheelwork is regulated by the vibrations of the pendulum. The clock can be made to run faster or slower by shortening or lengthening the pendulum; the pendulum of any common clock has a hand and screw below the bob for this purpose (see PENDULUM). The hands are attached to pivots, which pass through the dial, the pivot of the minute hand passing through that of the hour hand, so that each hand moves past the other without hindrance.



The striking part of a clock is entirely separate from the time-keeping part and is operated by a different weight or spring. It is, however, set in motion by a lever which is connected with the time-keeping part.

Invention of the Clock. Sun dials were the earliest instruments used for measuring time (see SUN DIAL). It is not known when the first attempts at clock-making were made, but there are accounts of such attempts as early as the seventh century. In the early part of the ninth century a clock was presented to Charlemagne, and in the following century one was given to Pope Sylvester II; but it is not known that these were clocks with wheels and a weight, like those of a later date. It is probable that the invention of the clock is due to the monks, who needed a timepiece which would enable them to discharge their various duties at stated periods. Clocks are known to have been in use early in the fourteenth century, and some of them were quite elaborate. They not only marked the hours of the day, but they also indicated the course of the sun and moon and the ebb and flow of the tides. In the fourteenth century the first large clocks on steeples also appeared.

First Clocks in America. The first clocks used in the United States had no case, but they were fastened to the wall of the room near the ceiling, and the weights and pendulum were without protection. Later a case was added, which rested upon the floor and extended upward for six feet or more. For many years the works of all American clocks were of wood and were made entirely by hand. Finally, brass clocks replaced the wooden ones, and these at first were also made by hand, but later a die for casting the wheels from rolled brass plates was used. With the introduction of this invention, clock-making by machinery was inaugurated and machine-made timepieces took the place upon the market of those made by hand. The largest clock factories in the United States are in Connecticut.

Largest Clock in the World. The largest clock in the world faces New York harbor from the New Jersey shore, having been constructed for a soap-manufacturing company. The dial is thirty-eight feet in diameter, the minute hand is twenty feet long, and the weight which provides the power for keeping it running weighs a ton. The entire clock weighs six tons. By night electric lights trace the hands and the figures on the dial. This clock is so large that the tip end of the minute hand travels twenty-four inches every minute. See WATCH; STRASSBURG CLOCK.

CLOSED SHOP, a condition with respect to union labor which is explained in the article OPEN SHOP.

CLOTBUR. See COCKLEBUR.

CLOTH, a woven fabric, usually made of cotton, wool, flax or silk. But in tropical countries it may be made of the fiber of hemp, jute or other plants. Cloth is woven on the loom. The weaver uses two sets of threads, the *warp* threads, which are run lengthwise of the goods, and the *weft* or *woof* threads, which run across the warp. The *selvage* is the edge of the cloth, woven in such a manner as to prevent raveling. The warp takes various names; it is sometimes called the *foundation* or *back* of the goods, and the woof is often called the *filling*.

When one says that a piece of goods has a cotton back and a silk filling, he means that the warp is of cotton and the weft of silk. All-wool cloths have both the warp and the weft of wool, but most so-called woolens contain more or less cotton or other fiber. Worsted goods are made of combed wool that is well twisted.

The varieties of cotton cloth most extensively used are muslins, including sheetings and shirtings, as well as the finer goods of this name; also the cotton cambric, canvas, duck, dimity, gingham and calico. Satinette, tweeds, jeans and some cashmeres are made on a cotton warp with a weft of wool. Lawns, cambrics, Damascus sheetings and towelings are made of flax and are called linens. Cloth may be plain, like common muslin; twilled, like tweeds; piled, like velvet and plush; figured, like damask; mixed, like cheviot, and checked or striped, like gingham, according to the way in which the weft threads are woven into the cloth. The width of the cloth depends upon the number of threads in the warp; its fineness or coarseness depends on the size of the threads and their distance apart.

Related Articles. Consult the following titles for additional information:

Calico and Calico Printing	Linen
Cambric	Loom
Canvas	Muslin
Cotton	Plush
Crape	Satin
Crinoline	Shoddy
Damask	Silk
Dimity	Velvet
Flannel	Weaving
Flax	Woolen and Woolen Manufacture
Gingham	Worsted

CLOTHES, *kloze,* MOTH, the name given to several small moths whose larvae (young) are destructive to woolen fabrics, feathers and furs. They not only feed upon the material, but the larvae use it in the construction of the cases in which they undergo the pupa stage. It is not easy to prevent the damage done by the clothes moths, but airing and sweeping closets frequently, and beating, brushing and exposing clothes to the sunlight will diminish the ravages. Tobacco, camphor, tarred paper, naphtha balls and cedar shavings seem obnoxious to the insects.

CLO'THO, one of the three *Fates* (which see).

CLOUD, a visible mass of particles of water in the air; a mass of condensed vapor; atmospheric moisture condensed as rain or snow; a fog high in the air. All the above definitions apply to the somber or gorgeous masses which float menacingly or lazily overhead.

Victor Hugo characterized them in *The Vanished City* as "the only birds that never sleep." Shelley, in *The Cloud,* summarizes their beauty and utility in the following stately lines:

I bring fresh showers for the thirsting flowers,
From the seas and the streams;
I bear light shade for the leaves when laid
In their noonday dreams.

From my wings are shaken the dews that waken
The sweet buds every one,
When rocked to rest on their mother's breast,
As she dances about the sun.

I wield the flail of the lashing hail,
And whiten the green plains under,
And then again I dissolve it in rain,
And laugh as I pass in thunder.

Clouds differ from fogs only in their height and degree of density. The average height of clouds is calculated to be two and

FIG. 1

one-half miles, thin and light clouds being much higher than the highest mountains; while thick, heavy clouds often touch low mountains, steeples and even trees.

Kinds of Clouds. Clouds differ much in form and character, but they are generally classified into four simple or primary forms:

(1) The *cirrus* (Fig. 1), so-called from its resemblance to a lock of hair, consisting of fibers which diverge in all directions. Clouds of this description float at a general height of from three to five miles above the earth's surface.

(2) The *cumulus* (Fig. 2), a cloud which assumes the form of dense convex or conical heaps, resting on a flattish base. It is called also the summer cloud. Under ordinary circumstances these clouds accompany fine weather, especially in the heat of summer.

They attain their greatest size early in the afternoon and gradually decrease toward sunset.

FIG. 2

(3) The *stratus* (Fig. 3), so named from its spreading out uniformly in a horizontal layer, which receives all its additions in volume from below. It belongs essentially to the night, and it is frequently seen on

FIG. 3

calm summer evenings after sunset ascending from the lower to the higher grounds, and dispersing in the form of a cumulus cloud at sunrise.

(4) The *nimbus,* or *rain cloud,* is recognized by its fibrous border and uniformly gray aspect. It is a dense cloud, spreading out into a crown of cirrus and passing beneath into a shower. It presents one of the least attractive appearances among clouds, but it is only when the dark surface of this cloud forms its background that the splendid phenomenon of the rainbow is exhibited in perfection (see FOG; RAIN; WIND).

The first three primary forms of clouds are subdivided as follows: 1, the *cirro cumulus,* composed of a collection of cirri, and spreading itself frequently over the sky in the form of beds of delicate snowflakes; 2, the *cirro stratus,* or *wane cloud,* so called from its being generally seen slowly sinking and in a state of transformation—when seen in the distance a collection of these clouds suggests the resemblance of a shoal of fish, and the sky, when thickly mottled with them, is called in popular language a *mackerel sky;* 3, the *cumulo stratus,* or *twain cloud,* one of the grandest and most beautiful of clouds, consisting of a collection of large, fleecy clouds overhanging a flat stratum or base.

Cloud-burst, the name generally applied to an unusually heavy local rain. In the United States the term is restricted to a rain exceeding six inches and falling at the rate of ten inches, or more, per hour. Cloud-bursts cover only very small areas, usually but a few acres in extent. They cause the sudden overflow of streams and often convert dry channels into mountain torrents whose effect is very destructive.

CLOVER, *klo'ver,* one of the most attractive and useful plants, recognized by botanists as a member of the pea family. It will grow wherever grass will flourish. There are more than 300 species, of which some are weeds, but many are valued as food for cattle. Common *red clover* lives for two years and sometimes, especially on chalky soils, for three years. This is the kind most commonly cultivated, as it yields better than any of the other sorts. *White clover* is a most valuable plant for pasturage over the whole of Europe, Central Asia and North America, and it has also been introduced into South America. The bee gathers much of its best honey from clover, for the blossoms are rich in nectar. It is important to know, too, that clover will not grow where there are no bumblebees, for they are necessary to its fertilization. Australia wished to grow clover, but they could not do so until the farmers imported bees.

Alsike, or *Swedish clover,* has long been cultivated in the south of Sweden, and now for over a score of years in other countries; it is strongly recommended for cold, moist, stiff soils. It resembles the common red clover in duration, stature and mode of growth. *Perennial red,* or *meadow, clover* much resembles the common red, but differs somewhat in habit, and the bright red flowers are larger and form a less compact head. Its produce is less in quantity and is not so nutritive as that of the common red. Clover is an excellent crop for exhausted lands, for the tubercles on the plant roots gather and store quantities of nitrogen, which go to restore the fertility of the soil.

CLOVES, *klohvz,* the dried flower buds of a tree which was first found in the Molucca Islands, but which is now grown in

various warm countries, including, to some extent, the West Indies. These buds, in powdered form, are used as a favorite condiment in cookery, and the oil of cloves has its place in medicine. The odor of cloves is fragrant; the taste sharp, warm and bitter. The tree is a handsome evergreen, from fifteen to thirty feet high, with large elliptic, smooth leaves and numerous purplish flowers on jointed stalks.

CLOVE
Opened and unopened flower bud and a longitudinal section of bud.

CLO'VIS, (465–511), king of the Franks, succeeded to the throne in 481. In 486 he overthrew the Roman governor at Soissons and occupied the country between the Somme and the Loire. He married a Christian princess, and he himself became a Christian as a result of the favorable outcome of a battle, for the success of which he had prayed to the God of his wife. In a struggle with the Visigoths he was entirely successful.

CLUB, a select number of persons in the habit of meeting for the promotion of some common object, as social intercourse, literature or politics. The building occupied is also called a club. The popular impression conveyed by the word is that of a group of men (or women—see WOMEN'S CLUBS) organized purely for social purposes, whose club rooms are arranged for luncheons, games, bowling, billiards, swimming and the like, also with spacious reading and lounging rooms. Such a description applies to many clubs, but there are many others devoted to more serious matters. In all, however, there are attractive arrangements for bodily comfort.

There are clubs which give a great deal of time and large contributions of money to the study of civic reforms; to art; to engineering; to literature; to advertising. There are motor clubs, aero clubs, whist clubs, country clubs, athletic clubs, etc., many occupying permanent elaborate quarters, others in unpretentious surroundings, but all imbued with the "get together" spirit.

A popular trend of the club idea is seen in the rapidly-developing community centers (which see) and in town clubhouses maintained by towns for everybody for miles in all directions. The farmer and his family go to town and find rooms in a special building intended to minister to all bodily comforts; in many small cities these centers approach in attractiveness many city clubhouses.

The coffee houses of the seventeenth and eighteenth centuries were modest examples of the beginning of modern clubs, though they were but a kind of restaurant or tavern where people resorted to take their meals.

CLUNY, *kloo'ne*, **LACE**, the name applied to a strong handsome lace made by hand in Europe, and to a number of machine-made varieties found everywhere in American markets. Genuine cluny is made of linen thread, only one size of which is used. The imitation clunies are more loosely woven, and two sizes of thread, which are usually cotton, are employed. The handmade lace is by far the more expensive. Because of its strength and beauty, cluny is popular as an edging for dresser scarfs and table linen.

The name refers to the museum of Cluny, in the French town of that name. In this museum specimens of ancient lace are preserved. Cluny, or Clugny, is situated in the department of Saône-et-Loire.

CLYDE, *klide*, a river of Scotland, formed by the union of several small mountain streams. On its shores is the city of Glasgow, below which it makes its way into the Atlantic through a broad estuary, or *firth*, ninety miles in length. The river itself is seventy-five miles long. The Clyde has large shipbuilding yards on its banks, and its

valley, known as Clydesdale, is noted for its orchards, coal and iron mines and a breed of fine horses.

CLYDE, Lord. See Campbell, Sir Colin.

CLYTEMNESTRA, *kli tem nes'trah,* in Greek mythology, the half-sister of Helen and of Castor and Pollux, and the wife of Agamemnon. During the absence of her husband in the war against Troy, she bestowed her favors on Aegisthus, and together they murdered Agamemnon on his return from Troy. Then with Aegisthus she governed Mycenae for years, until she, with her lover, was killed by her son Orestes.

Vegetation of Carboniferous Period

COAL, a black, or brownish-black, solid mineral which burns readily and gives off great heat. Most people are familiar only with the black variety; that which has a brownish tinge is known as *lignite.* Mankind has become so dependent upon coal that when the supply is reduced industry is retarded, and the entire economic structure is threatened. Coal runs our factories; it heats our buildings; it runs the great dynamos which provide light; it moves railroad trains and nearly all ships.

"Behind the men who battle in the trench
There stand the workmen at the lathe and bench;
But back of them and master of them all
The miner stands and holds the world in thrall."

If a lump of coal could tell us the story of its life it would carry the tale back millions of years, to a time when vast areas of the earth were swampy, supporting very luxuriant vegetation, when there were no men, no mammals, no birds. Only strange reptiles, strange fishes and other water animals whose species were long ago extinct lived upon the earth, whose climate was warm, even to the polar regions. During a long period of time known as the Carboniferous Period (which see)—nobody knows how many millions of years—coal was formed, layer upon layer, from the decaying vegetable matter of that humid age

During these ages large areas of low land were choked with vegetation, which died at the bottom, but kept growing at the top. As the plants died they partially decayed, and the weight of the vegetation above pressed them closely together. In the course of time these areas were depressed and covered with water and sand. After remaining under water for a long time, they were again elevated and the sand became rock, upon the surface of which soil accumulated, and in this flourished another growth of vegetation similar to that previously destroyed. In time this was sunk below the water and was covered. The pressure and heat attending these changes converted the vegetable matter into coal. There were as many upheavals and depressions as there are seams, or layers, of coal, and since these have not all been discovered, we do not yet know how many such changes occurred. The veins of coal and the rock lying between them, taken together, are known as the *coal measures.* The vegetation of the time resembled ferns, rushes and club mosses, and it also included certain species of trees that are now extinct. It was very luxuriant, the ferns forming trees twenty-five or more feet in height, and some of the club mosses exceeding in size the largest climbing plants of the tropical regions.

Varieties. Coal is divided into three varieties, according to its degree of hardness and the amount of carbon which it contains. These are anthracite, bituminous and lignite. The early geologists applied the name bituminous to a certain kind of coal, because it had some of the properties of real bitumen—it melts at a temperature far below the burning point. Later investigations proved that no kind of coal contains bituminous matter, but the name is still applied to the coal with 50 to 80 per cent of fixed carbon. Anthracite coal has from 80 to 90 per cent of carbon.

Anthracite. Anthracite is the hardest and best variety of coal. It is supposed to be that which was first formed, and it occurs deep in the earth. The largest mines are found in the eastern part of Pennsylvania and in Nova Scotia. Though some of the veins of anthracite occur at great depths, many of them, on account of the disturbance of the coal measures, have been thrown up and outcrop on the hillsides in the anthracite region. Veins of this sort are easily mined, since the coal is obtained by excavating a

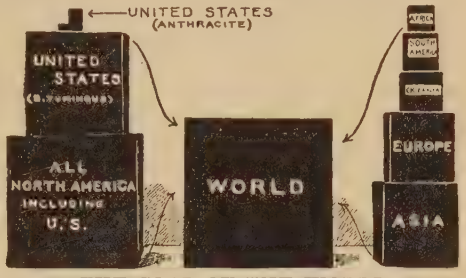
gallery or tunnel into the side of the hill. Anthracite is generally used for heating dwellings, and it is now to quite an extent employed in the manufacture of illuminating gas. It burns with little or no flame and without smoke, but it produces an intense heat.

Bituminous Coal. Bituminous coal is often known as *soft* coal. It contains much more bituminous matter than anthracite and is much softer; many varieties of it burn with considerable flame and produce a dense black smoke caused by the unconsumed carbon escaping into the air. This coal is found upon the western slope of the Appalachian Mountains, and the fields extend westward as far as the Mississippi River. The great coal fields of Ohio, West Virginia, Indiana and Illinois contain bituminous coal measures. Bituminous coal is much more extensively distributed than anthracite and is mined in much larger quantities. It is used on locomotives, in the manufacture of coke and for many other industrial purposes.

Cannel Coal is a variety of bituminous coal which is very compact and which when lighted, burns from one end of the lump like a candle; hence its name. It is desirable for burning in open grates.

Lignite. This is the most recently formed coal, is usually of a brown color and contains more or less earthy matter. It is found in the coal measures west of the Mississippi River, and important mines have been opened in North Dakota, Montana and a number of states in the Rocky Mountains. Because of the scarcity of other fuel in these localities, lignite is of considerable local value, though its impurities render it useless for manufacturing purposes, and it does not burn as readily or produce as intense heat as either of the other varieties described.

Where It Is Found. Coal is quite generally distributed over the earth. In Europe the leading coal producing countries are Great Britain, Germany, France, Austria, Belgium and Russia. The Russian fields are the most extensive on the Continent, but they have not been fully developed. In Asia coal is found in India, China, Japan and the Malay Archipelago. It is supposed that the coal fields of China are the most extensive in the world, but as yet this is not known to be true. As far as discovered, the coal fields of Africa are in the southern part of the continent, in Cape Colony and the vicinity of the Zambesi River. There are also valuable coal fields in Australia, New Zealand and the Philippine Islands, and profitable mines have been opened in Mexico, Argentina and Chile.



THE COAL OF THE WORLD
The portion cut from the anthracite cube represents the quantity already mined.

COAL FIELDS OF UNITED STATES AND CANADA

As far as it is known the coal measures of the United States far exceed in area those of any other country. Altogether, they include over 300,000 square miles, or an area of more than six times the size of the state of Ohio. These coal fields are distributed as shown on the map herewith.

The coal measures of Canada are geologically extensions of those in the United States. The most important fields are in Nova Scotia and British Columbia. These fields yield a high grade of bituminous coal.

The coal produced in Saskatchewan and Alberta varies from a low grade of lignite to a good bituminous.

Production. Great Britain produces nearly as much coal as the United States, though her coal beds are of much smaller area, including only about 12,000 square miles. The annual output of coal for the world is about 1,200,000,000 short tons. Of this, the United States produced in 1918, 685,356,000 tons, of both anthracite and bituminous. Great Britain produces in normal years about 300,000,000 and Germany 250,000 tons. These three countries supply approximately 85 per cent of the world's demands for coal. Canada's production is still small, from 12,000,000 to 14,000,000 tons a year, of which Nova Scotia produces one-half, British Columbia one-fourth and Alberta a little less than one-fourth. The following table summarizes the production in 1918 in the leading coal sections of the United States, in tons:

Pennsylvania (bituminous)	183,712,000
Pennsylvania (anthracite)	99,470,000
West Virginia	91,350,000
Illinois	91,263,000
Ohio	46,464,000
Kentucky	29,690,000
Indiana	27,325,000
Alabama	21,280,000
Colorado	12,485,000
Virginia	10,100,000

Coal Mining. Coal is usually found in horizontal layers, except in the anthracite regions, where some veins are in an oblique position. In some mines the coal is so near the surface that the latter can be removed and the coal exposed. Mining is then a simple matter—as easy as quarrying and carried on in the same manner. When coal is deeper in the earth, such veins are often mined by excavating a gallery into the side of the hill, but most coal mines are entered through a vertical shaft, which is sunk to the bottom of the first workable vein. This shaft is rectangular in shape, usually 30 feet long and 8 to 10 feet wide. It is divided into four sections, in two of which the hoisting cages operate. Of the others, one is generally used for ventilation and the other for conveying pipes for pumping and electric wires. This division also has a stairway or system of ladders, which may be used in case the hoisting machinery is injured. From the foot of this shaft a gallery is excavated in opposite directions. If the

Outline on Coal

I. Definition
II. Varieties
  (1) Anthracite
  (2) Bituminous
    (a) Cannel
  (3) Lignite
III. Formation
  (1) Decayed Vegetation
    (a) By pressure
    (b) By heat
  (2) Upheavals
  (3) Coal Measures
IV. Present Sources of Supply
  (1) United States
  (2) Great Britain
  (3) Germany
  (4) Other countries
V. Methods of Mining
  (1) Open working
  (2) Closed working
    (a) Room-and-pillar system
    (b) Long-wall system
    (c) Ventilation
VI. By-Products
  (1) Coke
  (2) Gas
  (3) Tar
    (a) Naphtha
    (b) Creosote
    (c) Pitch
    (d) Dyes

Questions on Coal

What is coal? How is it formed?

What means have we of knowing the sort of vegetation from which coal was formed?

What are the classes of coal according to hardness?

Which is the best? Is it found near the surface?

Where are the largest mines of your variety?

Which variety is known as soft coal?

Where are the great fields of this coal found? What are its important uses?

What is cannel coal? Why is it especially desirable?

Where is lignite coal found? How does it compare in age with other varieties? Why is it useless for manufacturing purposes?

vein of coal is deep enough to admit of working without the removal of rock, little or no rock is disturbed; otherwise, enough rock has to be excavated to enable the miners and tramcars to pass through the gallery. From this main gallery, other galleries are excavated at frequent intervals, running at right angles to the main gallery, and from each of these are still smaller galleries, leading into the vein of coal. The roof of the mine may be supported in one of two ways—by leaving pillars of coal at frequent intervals, or by the use of timbers. In a mine free from obstructions, the arrangement of galleries resembles very closely that of the streets in a well-planned city.

Tramways are laid in the main gallery and those leading off from it. Upon these, cars are hauled by mules or, in very large mines, by electric power, to the foot of the shaft, whence they are run upon the hoisting cages and elevated to the surface, where they are unloaded by dumping. In some of the coal measures, the shaft is sunk until it cuts a number of veins of coal, and in this case cars are hoisted from different levels; but in the bituminous fields it is not customary to work more than one vein at a time.

Because of the formation of gases (see FIRE DAMP), coal mines need to be more thoroughly ventilated than other mines. The ventilation is provided either by means of a fan at the foot of the shaft, to draw air from a fresh air shaft at another part of the mine, or by a fan on the surface, which forces the air in through a shaft constructed for that purpose. By the use of partitions the direction of the air current is controlled so that every part of the mine is ventilated. The portions newly opened are usually more dangerous than the others, for it is in these that the gases are liable to collect.

History. It is not known when or by whom coal was first used. It is referred to by Greek historians as early as 300 B. C., and it was in use in Great Britain as early as A. D. 852. It is supposed that the Britons were the first people to make practical use of it, and coal-mining was in successful operation in the island more than three hundred years before Columbus discovered America. The first discovery of coal in the United States, of which we have any record, was made by Father Hennepin near Ottawa, Ill., in 1679. The first mine worked in the United States was opened at Richmond, Va., in 1750. Anthracite was mined as early as 1793, but on account of the difficulty of igniting it, it had not come into general use until the second quarter of the nineteenth century. Bituminous coal came into use in the United States earlier than this, but on account of difficulty of transportation it was not placed on the market until after 1820. From that date the use of coal became general, and with the increase of railway lines its uses have multiplied. Coal is now so closely connected with all lines of industries that the business of the country is practically dependent upon it.

Related Articles. Consult the following titles for additional information:

Carbon	Diamond
Carboniferous Period	Geology
Charcoal	Mining
Conservation	Peat

COALITION, *ko al ish'un,* **CABINET,** a cabinet representing the various political parties of a country. A Cabinet usually is strictly a one-party organization. It has always been so in the United States, as it is believed that the affairs of state can be administered more efficiently if the President's advisers hold the same political beliefs as he. Such a Cabinet makes for harmony. On the other hand, the one-party Cabinet frequently prevents the nation from profiting by the services of the strongest men for particular positions. This may become a serious matter in times of stress, as during the World War, a fact recognized by Great Britain as early as 1915. In May the Cabinet headed by Asquith was reorganized, and a new Coalition Cabinet was chosen, made up of Liberals, Unionists and a Labor member. As the war progressed several Cabinet changes were made, but the coalition principle was retained. There was considerable agitation in America after the country entered the war for a Cabinet representing more than one party. See CABINET.

COAL TAR, or **GAS TAR,** a substance obtained in the distillation of coal for the manufacture of illuminating gas. It is a dark-colored, more or less viscid, mass, with a strong, disagreeable odor. It passes over with the gas into the condensers, along with ammonia liquor, but being heavier than the latter, it is easily separated from it when the whole is allowed to stand. Within recent years a great number of valuable products have been derived from coal tar by

distillation, such as ammonia, naphtha, creosote, carbolic acid and benzene, while it is also the source of the whole series of aniline colors (see ANILINE), other dyes, of alizarine and salicylic acid. It is also utilized in the manufacture of roofing, concrete and tar paper, in road making, and in the production of a disinfectant, and is employed as a preservative of timber and as a protective paint. Its derivatives are marketed as oils, medicines, flavors, perfumes, etc. During the World War there was great expansion of the coal-tar industry in the United States and Canada. The advance made by the former country is described under the title DYEING.

COASTAL, *kose'tal*, **PLAIN**, in general, a plain formed along the coast by the action of waves and tides, but, particularly, that portion of North America lying along the coast of the Atlantic Ocean and the Gulf of Mexico and extending from about the latitude of New York to the city of Vera Cruz. The western boundary of this plain is the foothills of the Appalachian Mountains, and the upper portion of it is usually called the Piedmont region. The plain varies in width on the Atlantic coast from fifty to 200 miles, and from the Gulf of Mexico it extends northward into the Mississippi Valley as far as the Ohio River. A narrower section also extends south and west through Texas and along the coast of Mexico. Along the Atlantic coast the western boundary is marked by an abrupt rise, caused by the upheaval of the rocks which formed the mountains. This edge, or rise, is usually known as the Fall Line. Below this most of the streams are navigable, and at the fall line they furnish abundant water power. For these reasons numerous thriving cities are located along this line. Among these are Richmond, Va., Raleigh, N. C., and Columbia, S. C.

COAST AND GEODETIC SURVEY, UNITED STATES, a bureau in the Department of Commerce having charge of the surveys of the United States and its dependencies, including the interior, coasts and coast waters. This bureau was established in 1807 and was made a bureau in the treasury department, but its work was so delayed that but little was accomplished previous to 1832. From that year to the present time the scope of its work has been rapidly broadened. In 1878 the bureau was designated as the Coast and Geodetic Survey, and in 1903 it was transferred to the department of commerce and labor. As now organized the bureau is in charge of a superintendent and operates under two divisions, the field division and the office division.

Some of the most important results accomplished by the bureau are the making of a minute survey of the coasts and the mapping of the same, together with the coast waters as far out as necessary, of the entire coast line of the United States, including Alaska, and of a part of the island possessions; the making of a network of levels over the eastern half of the United States, from the Atlantic Ocean to the Great Lakes; the making of important triangulations across the United States, notably that along the thirty-ninth parallel, and another along the ninety-eighth meridian, which extends into Mexico. The latest survey of importance covered the Philippine Islands and surrounding waters, completed in 1915.

COAST GUARD, the name applied since January, 1915, to the combined life-saving service and revenue-cutter service of the United States. The law by which the union was effected provides that operation shall be in charge of the Treasury Department in peace times, but that it shall operate in time of war as a part of the navy and be under the control of the Navy Department.

Life-Saving Service. This branch of the government was organized in 1871, prior to which date all activity of this nature was local and was supported by voluntary subscriptions. There are now 279 coast guard, or life-saving, stations, under an organization comprising thirteen districts. Stations are located on the Atlantic coast, the Gulf of Mexico, the Great Lakes, and the Pacific coast, including stations in Alaska. There is one purely inland station, at the falls of the Ohio River, near Louisville, Ky.

Equipment. Each station is equipped with a well-constructed building containing living quarters for the men—from ten to twenty—and space for boats.

The boats are usually two in number, each about twenty-five feet long and six to eight feet wide, and they are equipped with air chambers to prevent sinking. There is also in each station a small cannon whose range is nearly half a mile. The cannon shoots a projectile, to which is fastened a stout line, to a vessel in distress, when high seas make

it impossible to navigate the station boats. When the line is seized by the vessel's crew it is used to haul ropes and breeches buoys from the shore, and in these the passengers and crew effect their escape. (In connection with life-saving devices, see LIFE PRESERVER.)

Revenue Cutter Service, a department which enforces laws relating to the interests of the United States on all waters belonging to the nation. Under such supervision belong infraction of customs laws, quarantine regulations and neutrality in time of war. There are forty-four steam vessels in the service, and nineteen harbor and anchorage vessels. The officers are commissioned in the navy and have the same pay and allowances as regular navy officers.

Duties of the Coast Guard. In general, the duties of the service may be outlined as follows:

1. Rendering assistance to vessels in distress and saving life and property.
2. Destruction or removal of wrecks, derelicts and other floating dangers to navigation.
3. Extending medical aid to United States vessels engaged in deep sea fisheries.
4. Protection of the customs revenue.
5. Operating as a part of the navy in time of war or when the president shall direct.
6. Enforcement of law and regulations governing anchorage of vessels in navigable waters.
7. Enforcement of law relative to quarantine and neutrality.
8. Suppression of mutinies on merchant vessels.
9. Enforcement of navigation and other laws governing merchant vessels and motor boats.
10. Enforcement of law to provide for safety of life on navigable waters during regattas and marine parades.
11. Protection of game and the seal and other fisheries in Alaska, etc.
12. Enforcement of sponge fishing law.

In addition to the foregoing the services of the coast guard include many other things, such as warning vessels running into danger, medical and surgical aid to the sick and injured, recovery and burial of bodies cast up by the waters, extinguishing fires, maintenance of public order, acting as pilots in emergencies and furnishing transportation to other branches of the public service.

COASTING, a favorite winter pastime from the earliest days, and still in the United States the most popular winter sport with children, excepting, perhaps, skating. The sleds used in coasting are made in a great variety of forms, some low and some high, some long and narrow. In some the runners are of solid board, shod with steel, while in others the runners consist of open iron framework, drawn forward and curved upward in front. Where the snow is loose the high sleds are better, but on a well-packed slide the low ones make better time and are easier to handle. *Bobs* are constructed by fastening two ordinary sleds together by a long plank, the first one being attached to the plank by a pivot, which allows motion in steering. The steersman usually lies flat and grasps the forward sled in such a way that he may turn it easily, while the rest of the party group themselves behind him. See TOBOGGANING.

COAST RANGE, a range, or series of ranges, of mountains, at a short distance from the Pacific coast, extending through the western part of California, across Oregon into Washington, where it is continued by the Olympic Mountains, and thence into British Columbia. Some of the summits rise to a height of 7,000 and 8,000 feet, and among the best known in California are Mounts Hamilton, Tamalpais and Diablo. The San Bernardino Mountains are sometimes considered a part of the Coast Range.

COATI, *ko ah'te,* the name of certain South American flesh-eating mammals, be-

COATI

longing to the raccoon family. The coati has a longer body than other members of the same family, and has a long, flexible snout. Coatis feed on worms, insects and the smaller quadrupeds, but chiefly on eggs and young birds. There are two species, the *Mexican* and the *Brazilian.*

COBALT, *ko'balt,* a lustrous, steel-gray metal with a reddish tinge, related to iron and nickel, and generally occurring in combination with arsenic and sulphur. It is often found in the same ore with nickel. Cobalt is never found free in nature except in meteorites. Pure cobalt obtained from ores is harder and stronger than iron, takes a good polish, and will neither tarnish nor rust. It is of chief value commercially

through its compounds, some of which are used to color glass, porcelain and paper. Cobalt blue is one of the most important of these compounds. The metal has given its name to a town in Ontario, where silver ores containing cobalt are found in such abundance as to constitute the world's chief source of supply.

COBALT, ONT., a town in the Nipissing district, on Cobalt Lake and the Temiscaming & Northern Ontario Railway. The Cobalt region is one of the richest silver producers in the world. Cobalt silver was discovered here in 1904, and in a few years the annual shipments of ore were valued at $16,000,000. Besides silver, nickel and arsenic are mined in considerable quantities. A large machine shop and foundry and thirteen ore concentrators are located here. The town is 300 miles north of Toronto. Population, 1911, 5,638.

COBB, IRVIN SHREWSBURY (1876–), a newspaper man and special correspondent, called by journalists the most brilliant of American reporters. His right to this distinction seemed confirmed by articles from his pen from the war zone in Europe, beginning in September, 1914.

Cobb was born in Paducah, Ky. He learned shorthand and became a reporter on a home paper. Soon greater Kentucky papers secured his services, and in 1904 his fame had reached New York City, whither he was called as special writer on the *Sun* and the *World*. At the outbreak of the World War he was engaged by the *Saturday Evening Post* of Philadelphia to write exclusively for it on the gripping war topic. While on visits home during the war he was in constant demand for lectures on the conflict. His writings are filled with humor and originality which give them constant charm. In book form have appeared *Europe Revised, Paths of Glory, Back Home, Roughing It De Luxe, Speaking of Prussians—; Live Talks with Dead Ones, Old Judge Priest,* and *The Glory of the Coming* (1919), as well as nearly a score of other stories scarcely less famous. Cobb is doubtless the only man who ever made money from an operation on himself for appendicitis; he wrote about it in a long article *Speaking of Operations.*

COB'DEN, RICHARD (1804–1865), an English statesman, known as the "apostle of free trade." His first political writing was a pamphlet entitled *England, Ireland, and America,* published in 1835. In this he gave clear utterances to the political views to which he adhered throughout his life, advocating non-intervention in the disputes of other nations, and maintaining it to be the only proper object of the foreign policy of England to increase and strengthen her connections with foreign countries in the way of trade and peaceful intercourse. In 1841 he entered Parliament, and he directed his efforts toward the repeal of the Corn Laws. The credit for the repeal, which was accomplished in 1846, belonged largely to Cobden.

COBLENZ, *ko'blents,* GERMANY, the capital of the Prussian Rhine province, is situated at the meeting place of the Rhine and the Moselle rivers, about fifty-seven miles southeast of Cologne. The city has many fine educational institutions, and a number of interesting medieval buildings. The chief industry is the production of Moselle wine. The place is well fortified. In 1918, in accordance with the terms of the armistice, it was occupied by allied forces. Population, 1910, 56,487.

COBOURG, *ko'burg,* ONT., a port on Lake Ontario, sixty-nine miles east of Toronto. The leading industries are car works, woolen and rolling mills and matting factory. The post office, town hall, armories, collegiate institute, asylum for the insane and several fine churches are noteworthy buildings. Beautiful parks, wide streets and pleasant location make it a favorite summer resort. Population, 1911, 5,074.

COBRA, or **COBRA DE CAPELLO**, *ko'bra de kah pel'o,* a poisonous hooded snake, found in Southern Asia. It is also called *spectacled snake* from a singular marking on the back of the neck. So exceedingly poisonous is its bite that in numerous instances death has followed within a few minutes, and under ordinary circumstances, where prompt measures have not been taken, a few hours is the longest time a person can expect to live. In India thousands of natives lose their lives yearly through cobra bites. It is probably the most deadly serpent known and does more damage than any other. The cobra is sometimes six feet in length, and when angry it raises its head and about a third of its body, swells its neck into a wide hood and assumes a very terrifying appearance. Its food consists of small reptiles, birds, frogs and fishes.

COBWEBS, a term applied to webs spun in out of way places by certain species of spiders, and also to networks of dust which collect in neglected places. See SPIDERS.

COCAINE, *ko'ka in,* or *ko kane',* a white crystalline substance prepared from the leaves of a shrub called *coca.* When injected beneath the skin or in contact with the mucous surfaces, cocaine produces insensibility, and accordingly it has been used extensively by dentists and oculists in deadening the sensation of pain during minor operations. Cocaine has a quieting and restful influence, but its use tends to breed a dangerous habit, as does the use of opium.

Coca, the shrub whose leaves furnish the useful drug, is native to South America, and cultivated in Ceylon, India and Java. It grows from three to six feet tall and produces small yellow flowers, and leaves resembling those of the tea plant. The dried leaves of the plant, mixed with pulverized chalk, are chewed by the South American Indians. The leaves have a stimulating effect, but their use is considered harmful.

COCCUS, *kok'kus,* a genus of scale insects. The males are elongated, have large wings and apparently no means for sucking, but the females are rounded or oval, about an eighth of an inch in length, have no wings and possess a beak or sucker by which they take up the juices of plants. At a certain time the females attach themselves to a plant. Here they lay their eggs and die, the bodies of some species drying up and forming habitations for their young. While some of these insects are garden and hothouse pests, others are of great value; for example, kermes, cochineal and gum lac are either perfect insects dried, or the dried secretions which the insects have formed. See LAC; COCHINEAL.

COCHIN-CHINA, *ko cheen',* or *ko'chin,* a French possession, forming part of the peninsula of Southeastern Asia, between Cambodia and Annam on the north and the China Sea. Its estimated area is 21,980 square miles. The country is traversed by the Mekong, the deposits of which have produced an exceedingly fertile soil. In the low and wet grounds much rice is grown. In the more elevated districts are grown tobacco, sugar cane, maize, indigo and betel. Among the other products are tea, gums, cocoanut oil, silk and spices. The natives excel in the use of wood, of which their temples and tombs are built. Saigon is the capital. Population, 1911, 3,050,785.

COCHINEAL, *kahch'i neel,* a dyestuff, consisting of the dried bodies of a species of insect, a native of the warmer parts of America, particularly Mexico. The insects, which are found living on a species of cactus, are gently brushed off, and are killed by being placed in vats of hot water, in ovens or under the heat of the sun. A pound of cochineal contains about 70,000 bodies. The finest cochineal is prepared in Mexico, where it was first discovered. Cochineal produces crimson and scarlet colors and is used in making carmine and lake. Algiers, Southern Spain and Peru are other sources of this dyestuff.

COCHINEAL INSECTS ON CACTUS
Male and female.

COCKATOO', the name of a number of species of climbing birds believed to be a member of the parrot family, although naturalists assume that these birds form a group by themselves. They have large hard bills, crests capable of being raised and lowered at the will of the bird, tails somewhat longer than those of the parrots, and long wings. Most of the cockatoos are white in plumage, though some of them are tinged with yellow or red. Their home is in Eastern Archipelago and Australia, where they live on roots, fruits, grain and insects. They can be easily tamed and are often kept in captivity, where some learn to speak a few words.

COCKATOO

COCK'CHAFER, a species of beetle, remarkable for the fact that it exists four or five years in the larval stage, during which time it preys upon the roots of grass and stalks of corn. In its adult stage it is about an inch long and is black in color. As it usually comes from the ground about the beginning of May, it is called the *May bug* or *May beetle*. It is destructive to leaves of various trees.

COCK'FIGHTING, a cruel amusement practised in various countries, first, perhaps, among the Greeks and Romans. It consists of causing roosters, or male fowls, to fight until one is vanquished, which occurs only when one is so badly injured that it cannot live. It was long a favorite sport with the British, and the training, dieting and breeding of cocks for fighting was the subject of many treatises. The cruelty of the sport led to its being discontinued among the better classes of people. Until prohibited by law there was much cockfighting in the United States.

COCKLE, *kok'l*, a name for bivalve mollusks common on the sandy shores of the ocean and much used as food. The two valves of the shells are nearly equal and have two small teeth, one on each side near the beak, and two larger remote teeth, one on each side. The shells of some species are beautifully marked and colored.

COCKLEBUR, *kok' 'l bur*, or **CLOT'BUR**, a troublesome weed, of which three species are known in temperate regions of North America. The burs, which are hard and covered with hooked prickles, are about an inch long, and as a number of these are borne on every plant the weed is a great nuisance in pastures or ranges where cattle or sheep feed. It is difficult to get them out of the wool of the sheep after they are once imbedded there, and, accordingly, efforts are always made to exterminate the weed in wool-raising districts. As the plant dies to the ground every year, it is not difficult to control its growth, if the plants are destroyed each year before the seed ripens.

COCK OF THE WOOD. See CAPERCAILZIE.

COCKROACH, an insect which is one of the most obnoxious pests that infest houses. It has an oval, elongated, flattened body, which is smooth on its upper surface. The males have parchmentlike wing covers, and the wings of the females are imperfectly developed. They are exceedingly agile in the night time, and are troublesome in houses, bakeries and wherever food is plentiful, as they eat all kinds of provisions. As they conceal themselves in cracks and crevices,

COCKROACH
a, view from above; b, view from below.

they very frequently find their way through water pipes and steam pipes into all rooms of a house.

The cockroach is a great enemy of the bedbug. Each female lays about thirty eggs in each of two compartments of a small case, which she carries about with her for seven or eight days. The young when hatched are nearly the same form as their parents, except that their wings are not well developed. There are about 1,000 species known. Various insect powders guaranteed to kill them are on the market; some housewives destroy them by pouring boiling hot water into the crevices where they hide.

COCOA. See CACAO.

COCOANUT, or **COCONUT**, *ko'ko nut*, an oval, woody fruit, from three to eight inches in length, covered with a thick, stringy husk and holding, inside, a firm, white, fleshy kernel. Within, the fruit is hollow, or partially filled with *milk*, a sweet and watery liquid of a whitish color. The thick husk, which protects the fruit, aids in spreading the tree among the islands where it is native, because the nut floats readily and may be carried long distances without injury. The cocoanut is the fruit of a palm which grows a straight, naked trunk from forty to sixty feet in height. The summit is crowned by featherlike leaves, among which the nuts hang in clusters of a dozen or more.

The cocoanut forms a large part of the food of the islanders, who eat it as it comes from the tree, either ripe or green. A large quantity of oil is obtained by pressing the fruit, and this is known as cocoanut butter,

which is exported and used in the manufacture of marine soap, in making stearin candles and for numerous other purposes. The cabbagelike bud at the top of the tree is boiled and eaten by the natives. From the sap a beverage is made which, when fermented, is called palm wine, and, when distilled, is known as *arrack*, a very strong liquor.

But the usefulness of the cocoanut tree does not end here. The natives use the leaves to thatch cottages, and from the fibers they make mats, cordage, baskets, sacks and other useful articles. The shells are made into beautiful cups, ladles and other ornamental utensils. From the trunks boats are made, or timbers for the construction of houses. The tree, which is a native of Africa, the East and West Indies and South America, is now grown almost everywhere in tropical countries and is one of the most useful trees in the world. A greater acreage is given to cocoanuts in Ceylon than to any other product of the soil. The tree begins to bear when about ten years of age and continues to produce from fifty to one hundred years without special attention.

COD, one of the most important of the food fishes. In the cod family there are two groups—the shore cod and the deep-sea variety. Millions are taken every year, but the supply remains constant, for cod are very prolific. A single female weighing seventy-five pounds has been found to contain close to 9,000,000 eggs. The destruction of eggs and young, which are preyed upon by other fish for food, is enormous, but the number growing to maturity is always ample.

Shore cod are confined to the temperate zones, but deep sea cod have a much wider range. The common cod, which constitutes the well-known food fish, has a slightly flattened body which tapers abruptly to the tail. It reaches maturity in about three years, but

COD

it is of sufficient size to be marketable when two years old. When full-grown the fish weighs from twelve to twenty pounds, though larger specimens are sometimes taken. The cod spawns in February, and the best months for fishing are October, November and December. The most noted fisheries are the Grand Banks, off the coast of Newfoundland.

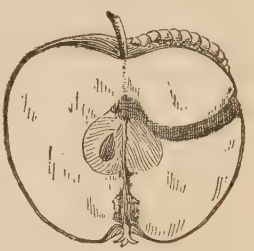
The fish are caught by hook and line. The fishermen go out in schooners, to each of which two or more small boats are attached. When it reaches the fishing grounds, the schooner anchors, and the fishermen put out long lines called *trawls*, to which are attached at frequent intervals shorter lines bearing hooks. A good-size schooner will put out lines containing from 10,000 to 15,000 hooks. After the trawls have been set the fishermen go along the lines in their small boats and haul in the fish that have been caught. When brought to the schooner, the fish are immediately dressed, split open and salted. The livers are saved, as from them cod-liver oil (which see) is obtained. As soon as the schooners receive a load they return to port, where the fish are stretched on platforms and exposed to the sun and air, and are dried and salted. The cod is the most important food fish taken off the eastern coast of North America.

CODE NAPOLEON, the basal law of the French nation, promulgated in 1804 and still in force. After the French Revolution there was wide diversity in the laws in various parts of France, and a new code, general in its application, was demanded. Napoleon, as First Consul, interested himself in the making of the new Code, and it was named for him. From time to time other governments adopted either the letter or the spirit of the Code Napoleon. It became the basal law of the French province of Louisiana, and the laws of that state are yet built on it. It is the basis of the laws of Quebec, which was and is yet essentially French; it has been adopted widely in South America and Central America, and it is still in force in Belgium, Holland, in several cantons of Switzerland and to a considerable extent in Italy.

CODE WRITING, a system of writing messages in such a way that the meaning can be learned only through a key to the code used. For example, figures may be substituted for letters, 1 standing for A, 2 for D, 3 for H, and so on. Sometimes certain words are made to stand for other words, or the letters may be variously juggled about. It is said that there is no code so intricate that someone cannot decipher it. The

Secret Service of all warring nations was called upon to use expert assistance in this respect during the World War. The famous Zimmerman note to Mexico was in code, as were those pertaining to Argentina, but they were all decoded in the United States and made public. Codes of the telegraph and cable companies are compiled in book form, they are not secret, but are used to shorten messages.

CODLING MOTH, a small moth whose larva is the familiar apple worm. The eggs are laid on the leaves or on the forming fruit, and when the grubs appear a few days later, they eat their way into the tiny apples at the point where the flower has fallen off. When a larva has reached its growth it emerges, seeks a sheltered place in a crevice of the bark or on the ground, and spins its cocoon. In many localities the moth appears within a few weeks, and a second brood of grubs is ready for the late crop of apples. The codling moth is the most destructive of apple pests, the estimated damage in the United States being about $10,000,000 yearly. The best remedy is a thorough spraying with an arsenic solution just after the blossoms fall, and a second spraying about three weeks later. The poison should fall on the upturned flower ends of the little apples, for the worms must be killed before they have a chance to burrow in the fruit. When wormy apples fall to the ground they should be disposed of so as to kill the larvae, and as many of the cocoons as possible should be collected and destroyed before the moths emerge.



THE CODLING MOTH

COD-LIVER OIL, an oil extracted from the livers of different species of cod. It is a pale yellow oil, of very disagreeable odor and taste, and is obtained by pressing it from the livers in a cold state, or by heat. It is easily digested, and if not taken in too large quantities, is considered an extremely valuable remedy in all wasting diseases. On account of its disagreeable taste, it is administered in capsules and various other forms. The milky mixture, known as *emulsion*, consists of a preparation of cod-liver oil with other remedies.

CODY, WILLIAM FREDERICK (1845–1917), better known as "BUFFALO BILL," was born in Scott County, Iowa. He spent his early life among Indians on the Western frontier, but at the beginning of the Civil War he offered his services as a Union scout, and rendered valuable aid to several commanders.

Cody was later a member of a camp of United States troops which protected the laborers during the construction of the Union Pacific Railroad, and he took the contract to supply the entire force with fresh buffalo meat for a certain period, hence his sobriquet of "Buffalo Bill." Later he collected a band of Indians, cowboys, rough riders, unbroken bronchos and a small herd of buffalo, and commenced a series of exhibitions in the principal cities of America. The show was known as the "Wild West Show." He made several tours of Europe with his exhibition.

COEDUCATION, *ko ed u ka'shun*, education of both sexes in the same schools. As public schools originally existed only for boys, when girls first began to attend elementary schools it was necessary for them to receive instruction separately, but in the same buildings with the boys. In this way coeducation began, and though it has been opposed in many quarters, the system has made steady advance in all progressive countries. In America boys and girls attend the same public schools from the kindergarten through high school, except in a few cities, and coeducation prevails in numerous colleges and universities. Yale, Princeton and Harvard, however, are for men alone, while Columbia admits women only to certain departments, and only the graduate department of the University of Pennsylvania is coeducational. Women are admitted to all the state universities. Private schools are about equally divided on the subject of coeducation. In Canada, England, France and Germany women are admitted to the universities, but the English universities award them certificates instead of degrees. Generally speaking, the majority of elementary schools in Europe are mixed schools, but the reverse is true of the high schools.

COELENTERATA, *se len ter a'tah*, the next to the lowest branch of the animal kingdom, including many-celled animals, all of which are very simple organisms, which have no distinct body cavity and no distinct circulatory system. They have a body cavity in which food is digested and from which it is

carried to all parts of the body through branches of the cavity. These animals are more or less symmetrical, their parts radiating from a center. Peculiar shining organs, or thread-cells, are located in the tentacles, Which are grouped around the mouth. By means of these tentacles food is captured and stunned or paralyzed by the stinging cells. Nearly all coelenterata are marine animals, and two distinct types are known: one, the free-swimming, bell-shaped form, medusa; and the other a more or less cylindrical form, fixed to some support. Some, like the coral animal, build in populous colonies and cover a great area of sea bottom. In color many of them are brilliant and show a great variety of delicate shades. See HYDRA; SEA ANEMONE; CORAL; SPONGE.

COEUR D'ALENE, *ker da layn'*, IDAHO, the county seat of Kootenai County, thirty-three miles east of Spokane, Wash., on the Chicago, Milwaukee & Saint Paul, the Northern Pacific, the Coeur d'Alene & Pend d'Oreille and the Coeur d'Alene & Spokane Electric Railways. The city has Coeur d' Alene College, a Catholic academy, a business college, three banks and two parks containing forty acres. It is a center for woodworking factories. The surrounding scenery is excelled in but few spots in the Northwest. Population, 1910, 7,291; in 1917, about 8,500.

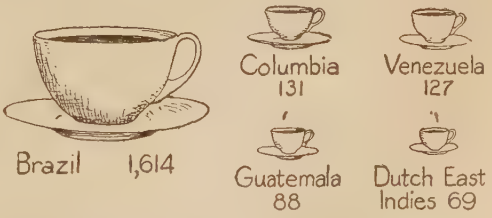
COFFEE, the seed or berry of an evergreen shrub, or small tree, which is cultivated in warm countries. The name also is given to a dark-brown, fragrant table beverage which is made from crushed coffee berries. The use of coffee is almost world-wide, particularly in cool climates, and its consumption is steadily on the increase, notwithstanding the objections which are insistently advanced against it.

Coffee contains a somewhat bitter principle called caffeine (*kaf'e in*, or *kaf'een*). In medical practice this is a drug, and it is a stimulant, with effects both harmless and bad, depending on the quantity taken. When from one to three or four grains are taken the effect is mildly stimulating, and it is declared that such a quantity does no harm to the normal person, who limits his coffee drinking to one cup at each meal. Excessive use of coffee leads to nervousness, sleeplessness, trembling hands and the like.

The coffee tree, when wild, grows from fifteen to thirty feet high, but in cultivation it is seldom allowed to exceed six feet. The leaves are dark green and have a waxy appearance on the upper surface. The flowers are white and appear in the axils of the leaves. The fruit is an oval, dark red berry, resembling a cherry when ripe. Each berry contains two cells, and each cell has a single seed, which forms the coffee nib or bean. These parts of the plant are shown in the color plate. Before roasting the seed is of a light green color. The tree lives for about forty years and bears fruit from the time it is three years old. The average yearly yield is about one pound of seeds to the tree, though some trees may produce from two to five pounds.

When ripe, the fruit is gathered by placing canvas under the trees and shaking them. The berries are dried in the sun, then passed between rollers, which crush the dried pulp, but do not crush the seeds. The fragments of pulp are then removed from the seeds by winnowing. After being thoroughly dried, the seeds are packed in large sacks, in which they are shipped to market. The brown appearance of the coffee found in retail stores is due to the roasting. Since the aroma developed by the roasting evaporates rapidly, coffee should not be roasted until it is desired for use. The different varieties, such as Mocha, Java and others, may be due to the locality from which the coffee is obtained, the real Mocha coming from Arabia, but they are all liable to be produced from the seeds of the same orchard, the name *Mocha* usually being given to the small beans, and *Java* to the larger ones. Mixtures of these produce other varieties.

Sources of Supply. Coffee is produced in Arabia, adjoining countries and to a small extent in northern Africa; but the principal producing region is Brazil, which now raises over two-thirds the world's supply. Coffee



COFFEE PRODUCTION

The diagrams picture the yield of coffee in five principal producing countries. The figures represent millions of pounds grown annually.

Outline on Coffee

I. The Plant
- (1) Characteristics
- (2) Leaves
  - (a) Surface
  - (b) Color
- (3) Blossoms
  - (a) Fragrance
  - (b) Color
  - (c) Shape
- (4) Fruit
  - (a) Bean
    - (1) Size
    - (2) Color
    - (3) Cells

II. Cultivation
- (1) Necessary conditions
- (2) Where grown
  - (a) Brazil
  - (b) Central America
  - (c) Mexico
  - (d) West Indies
  - (e) Ceylon
  - (f) Java

III. Consumption
- (1) United States
- (2) Canada
- (3) Germany
- (4) France
- (5) Austria
- (6) Other countries

IV. Conditions of Growth
- (a) Heat
- (b) Shade
- (c) Moisture

V. Food Value

Questions on Coffee

What is the height of the coffee tree? How would it compare in size with the plum tree?

What is the average number of pounds of coffee per tree from each crop?

What is the color of the berry before being roasted?

Describe the leaves, the blossoms, the fruit.

How are the berries gathered? How dried? How is the husk removed? How is coffee packed for shipment?

Of what countries is it a native?

Where does the best coffee come from, and what is it called?

plantations are also maintained in Central America and Mexico.

Source of Supply	Pounds
Brazil	1,614,000,000
Other South American countries	184,156,000
Central America	192,472,000
Mexico	81,000,000
West Indies	98,258,000
East Indies	107,006,000
Other countries	24,409,000
Total	2,301,301,000

The World's Largest Consumer of Coffee. The United States is by far the largest consumer of coffee; its annual consumption is two and a half times that of Germany, the next important consumer in normal times, and more than three times that of France. None of the other nations of the World, except Austria, Belgium and The Netherlands, are of importance. Canada uses only 700,000 pounds per year. A great deal of coffee is consumed by the natives of coffee-growing countries, but this is a cheap quality, generally mixed with other matter, and is not considered in estimates of supply and consumption.

Consumption	Pounds
United States	833,066,000
Germany	375,883,000
France	245,964,000
Austria-Hungary	131,340,000
Sweden	91,868,000
Netherlands	90,603,000
Belgium	81,864,000
Italy	51,632,000
Great Britain	29,195,000
Other countries	988,797,000

COF'FERDAM, a temporary enclosure which engineers build under the surface of water for the purpose of securing a dry foundation in the construction of bridges or piers. Usually it is formed of two or more rows of piles driven close together, with clay packed in between the rows. When the structure is completed the water in the enclosure is pumped out.

COF'FEYVILLE, Kan., founded in 1869, is a city in Montgomery County, one and one-half miles from the Oklahoma state line, on the Missouri Pacific, the Missouri, Kansas & Texas, the Santa Fe and the Iron Mountain railroads. The citizens are principally interested in ranches, oil and gas wells, zinc and lead mines and cement rock deposits; important industries are three oil refineries, an oil-tank car factory, two cold storages, railroad shops and what is claimed to be the second largest zinc oxide plant in the world

There is a Federal building a large opera house, a Y. M. C. A., a Y. W. C. A. and a motorized fire department. The commission form of government was adopted in 1912. Population, 1910, 12,867; in 1917, 18,331 (Federal estimate).

COF'FIN, the chest or box in which a dead body is enclosed for burial. Coffins were used by the ancients chiefly to receive the bodies of persons of distinction. Among the Romans before the Christian Era it was the custom to consume the bodies by fire and deposit the ashes in urns (see CREMATION), but stone coffins were later introduced. In Egypt coffins seem to have been universally used in ancient times. They were of stone, earthenware, glass and wood. The ancient Greeks made a coffin of a peculiar kind of limestone, which in a few weeks absorbed the flesh and other tissues of the body. This stone was called *sarcophagus,* and the coffins made from it took the same name, which means *flesh-eating.* Coffins among Christians were introduced with the custom of burying. Modern coffins are usually made of wood and are sometimes enclosed in a leaden case. Some tribes of Indians make basket coffins.

COHAN, GEORGE MICHAEL (1878–), a versatile and widely known theatrical producer, actor and dramatist, was born at Providence, R. I. At the age of nine he appeared professionally in the play *Daniel Boone.* Later he acted in vaudeville with his father, mother and sister, the family being billed as the Four Cohans. Cohan also starred in *Little Johnny Jones, George Washington, Jr.* and *Broadway Jones,* all of which he himself wrote. He is the author or adapter of numerous other successful plays, including *The Talk of New York, Get-Rich-Quick-Wallingford, Seven Keys to Baldpate, Hit-the-Trail Holliday* (based on the character of "Billy" Sunday) and the Cohan musical "revues." Of the many popular songs he has written the best known are *So Long, Mary* and *Over There.* The latter was the most successful of the scores of light songs inspired by the World War, and it became immensely popular with the soldiers and sailors. Cohan has also appeared in moving pictures, starring in some of his best-known plays.

COHESION, *ko he'zhun,* in physics, is that property of matter by virtue of which particles of like substance adhere to one another when brought into close contact. Solids have greatest cohesion, liquids have little, and gases entirely lack it. Cohesion causes the substance in brick, iron, etc., to stick together and retain the shape of the objects. For the property which causes particles of unlike matter to adhere to one another, see ADHESION.

COHOES, *ko hoze',* N. Y., founded in 1720 and chartered as a city in 1870, is nine miles north of Albany and three miles west of Troy, at the confluence of the Mohawk and Hudson rivers, and on the Delaware & Hudson and New York Central railroads. Electric railways run to all nearby cities. The chief manufactures include cotton cloth, underwear, iron products, paper and strawboard. There are over 300 manufacturing establishments. There is a large power plant which generates 50,000 horse-power, furnishing power to all the leading mills. The city was given the Indian name for the falls in the Mohawk at this point. Population, 1910, 24,709; in 1917, 25,292 (Federal estimate).

COIN'ING, the art of converting pieces of metal into current coins for the purposes of commerce. Coining is usually done in a government establishment, called a *mint.* Coining is one of the prerogatives of the supreme power in all nations, and counterfeiting or otherwise tampering with the coin is severely punished. In some cases small nations have their coins made by other countries, but they retain full power to regulate their coinage systems. In the United States the bureau of the mint was established as a division of the Treasury Department in 1873. It has charge of the coinage for the government and makes assays of precious metals for private owners (see ASSAYING).

In making coins at a United States mint the metal is first melted and cast into a bar. It is then *refined,* after which the alloy is added to harden it, the proportion being one part alloy to nine parts pure metal. The metal is then *cast* into ingots, which are taken to the *rolls,* where they are reduced to bars. The rolling machines are four in number, the rollers being adjustable and the space between them governed by the operator. About 200 ingots are rolled per hour with each pair of rollers. When the rolling is completed the strip is about six feet long. As it is impossible to roll perfectly true, it is necessary to *draw* these strips after they are softened by *annealing.* The drawing benches resemble long tables, with a bench on either side, at

the end of which is an iron box screwed to the table. In this are fastened two perpendicular steel cylinders with the space between them equal to the required thickness of the bar. As the bar is drawn between these cylinders they reduce it to an absolutely uniform thickness.

These strips are now taken to the *cutting* machines, each of which will cut 225 blank coins per minute. The *press* now used consists of a vertical steel punch. From a strip worth $1,100 about $800 of blanks will be cut. These are then removed to the adjusting room, where they are adjusted. After inspection they are weighed on very accurate scales. If a blank is too heavy, but near the weight, it is filed off at the edges; if too heavy for filing, it is thrown aside with the light ones to be remelted. The blanks, after being adjusted, are taken to the coining and milling rooms, and are passed through the *milling* machine. The blanks are fed to this machine through an upright tube, and as they descend are caught upon the edge of a revolving wheel and carried about a quarter of a revolution, during which the edge is compressed and forced up. By this apparatus 560 dimes can be milled in a minute; for large pieces the average is 120. The massive but delicate *coining* presses coin from 80 to 100 pieces a minute. These presses are attended by women. After being stamped, the coins are taken to the coiner's room. The light and heavy coins are kept separate in coining, and when delivered to the treasurer they are mixed in such proportions as to give him full weight in every delivery. By law, the deviation from the standard weight for gold coin must not exceed the one-hundredth part of an ounce to $5,000, and for silver coin, two-hundredths of an ounce to $1,000. Only the most perfect machinery can assure such results. See MINT; MONEY.

COINS, FOREIGN, VALUE OF. Each nation has its own system of coinage, and different units serve as bases of monetary systems. The United States and Canadian unit is the dollar; the British, the pound sterling; the French, the franc; the German the mark. The comparative values of all these units and others of less important countries is given in the following table. Not always is the exchange value the same as the intrinsic value; wars which impoverish a nation or decrease of foreign trade may reduce the value of foreign moneys in other markets:

Coin.	Country	U. S. equivalent
Argentina (gold)	Argentina	$4.820
Balboa (gold)	Panama	1.000
Bolivar (silver)	Venezuela	.193
Boliviano (silver)	Bolivia	.389
Cash (copper)	China	.006
Cent	China	.005
Centavo (copper)	Mexico	.005
Centime (copper)	France	.002
Condor (gold)	Chile	7.300
Condor (gold)	Ecuador	4.900
Crown (silver)	Austria	.203
Crown (silver)	Denmark	.268
Crown (silver)	Great Britain	1.220
Crown (silver)	Norway	.268
Crown (silver)	Sweden	.268
Dinar (gold)	Serbia	.193
Dinero (silver)	Peru	.050
Dollar (gold)	Newfoundland	1.014
Dollar (gold)	British possessions	1.000
Dollar (gold)	Colombia	1.000
Dollar (gold)	Liberia	1.000
Dollar (silver)	China	.475
Dollar (gold)	Santo Domingo	1.000
Drachma (silver)	Greece	.193
Escudo (gold)	Portugal	1.080
Farthing (copper)	Great Britain	.005
Florin (silver)	Austria	.400
Florin (gold)	Netherlands	.402
Franc (silver)	France	.193
Franc (gold)	Belgium	.193
Franc (gold)	Switzerland	.193
Gourde (silver)	Haiti	.965
Guinea (gold)	Great Britain	5.040
Gulden (silver)	Austria	.480
Heller (silver)	Austria	.004
Kopeck (copper)	Russia	.005
Krone (see crown)		
Leu (silver)	Roumania	.193
Libra (gold)	Peru	4.865
Lira (silver)	Italy	.193
Lira (gold)	Turkey	4.400
Mark (silver)	Germany	.238
Mark (gold)	Finland	.193
Medjidie (gold)	Turkey	.880
Milreis (gold)	Brazil	.546
Milreis (gold)	Portugal	1.080
Napoleon (gold)	France	3.860
Onlik (silver)	Turkey	.400
Ore (copper)	Scandinavia	.0025
Para (silver)	Turkey	.001
Penny (copper)	Great Britain	.020
Perper (gold)	Montenegro	.203
Peseta (silver)	Spain	.193
Peso (gold)	Argentine Republic	.965
Peso (gold)	Chile	.365
Peso (gold)	Colombia	1.000
Peso (gold)	Cuba	.910
Peso (silver)	Mexico	.498
Peso (silver)	Paraguay	.398
Peso (gold)	Philippines	.500
Peso (gold)	Uruguay	1.034
Pfennig (copper)	Germany	.0025
Piaster (silver)	Turkey	.044
Pound (gold)	Egypt	4.943
Pound (gold)	Great Britain	4.865
Ruble (gold)	Russia	.515
Rupee (silver)	India	.324
Scudo (gold, silver)	Italy	.950

Sen (copper)	Japan	.005
Shilling (silver)	Great Britain	.240
Sixpence (silver)	Great Britain	.120
Sol (silver)	Peru	.490
Soldo (copper)	Italy	.010
Sovereign (gold)	Great Britain	4.866
Sucre (gold)	Ecuador	.487
Tael (customs, silver)	China	.828
Tical (silver)	Siam	.370
Yen (silver)	Japan	.498

COIR, *kwahr,* fiber from the husk of the cocoanut, from which are manufactured matting, bagging, ropes and cables. Coir cordage, because it lasts well in salt water, and also because it is light, strong and elastic, is preferable in many respects to ropes of hemp. Mats and matting are now largely made of coir, which is also used in coarse brushes, for stuffing mattresses and for other purposes.

COKE, a variety of charcoal, made by burning bituminous coal with a limited supply of air. The coal is usually burned in a brick or stone kiln, called an oven. The coal is put through an opening at the top of the oven, and the coke is taken out at the bottom. A ton of coal will produce about two-thirds of a ton of coke. Coke is also formed as a by-product in the manufacture of illuminating gas. Good coke has an iron gray color, is hard, porous and brittle. It is almost pure carbon and is extensively used in smelting iron and other metals, since the sulphur contained in the coal injures the metal. Coke is also used to some extent as a fuel for heating purposes. It is manufactured in large quantities, in sections where bituminous coal of the proper quality is found, or in places to which it can be transported economically to industrial centers.

COKE, Edward, Sir (1552–1634), an eminent English lawyer. He was chosen recorder of the cities of Norwich and of Coventry, knight of the shire for his county and attorney general. As such, he conducted the prosecutions for the crown in all great state cases. In 1613 he became chief justice of the Court of King's Bench, but because he opposed James I and supported liberal measures in Parliament, he was in 1621 committed to the Tower and soon after expelled from the privy council. In 1628 he was chosen member for Buckinghamshire and was one of the chief authors of the Petition of Right. His principal works are legal textbooks of the highest value, the most famous being *Coke upon Littleton; or the First Institute.*

COLCHICUM, *kol'kik um,* the name of a group of plants whose common representative is the meadow saffron. This is a bulbous-rooted, stemless, perennial plant which grows in various parts of Europe. From a small corm or bulb buried about six inches deep and covered with a brittle brown skin, there rises in the early autumn a tuft of flowers having much the appearance of crocuses, flesh-colored, white or even variegated. They soon wither, and the plant disappears till the succeeding spring, when some broad leaves are thrown up by each corm, along with a triangular, somewhat oblong seed vessel. From the seeds is obtained a bitter alkaloid drug called *colchicine,* used in the treatment of gout. The meadow saffron is acrid and poisonous.

COLD HARBOR, Battles of, several battles of the Civil War, fought between June 1 and June 12, 1864, between an army of 120,000 Union troops commanded by Grant and a force of 100,000 Confederates commanded by Lee. Lee had occupied Cold Harbor and was entrenched when an advance guard of the Union force reached the place on June 1. The Federals made an ineffectual assault upon the works and then retired until June 3, when in the early morning several attacks were made along the whole Confederate line. In the last of these, which lasted less than thirty minutes, the Union forces were hurled back in confusion, with a loss of nearly 7,000 men, ten times as great as the loss suffered by the opponent. For seven days desultory fighting continued, but on June 10 General Grant began a flank movement toward Richmond. The Battles of Cold Harbor are considered by critics to have constituted the most serious mistake in Grant's career. He himself once said, "No advantage whatever was gained to compensate for the heavy losses. Indeed, the advantages were on the Confederate side."

COLD STORAGE, a system of cooling or freezing, whereby any commodity can be kept indefinitely at a given temperature. An ice box or refrigerator in the home is a cold storage plant on a small scale. In large buildings erected solely for cold storage there are rooms where the temperature is maintained a few degrees above the freezing point and others where it is always below freezing. Some commodities will be destroyed if frosted, while others must be frozen if they are to be preserved for any

great length of time. For example, potatoes keep best at a temperature of 36°; bacon and ham, 40° to 45°; while butter, if it is to be kept in storage for several months, should be kept at 10°; fish, at 15° to 18°. Furs are stored in summer in vaults whose temperature is reduced to 30° to 35°.

In addition to air-tight rooms, a storage plant consists of machinery for cooling the air and pipes from it to all rooms to convey the cooled air. The method of cooling in the best plants is by evaporation, using a volatile liquid such as ammonia. Sulphuric ether, sulphurous acid and carbonic acid are used to some extent. The process of condensing the liquid is too complicated to be made clear in brief space.

The refrigeration idea has been applied also to railroad cars, but here ice is used to maintain low temperatures. Through such refrigeration cities in northern latitudes are able to secure berries, fruits and vegetables from warm southern sections months before such products can be ripened at home.

COLD WAVE, a wind or anti-cyclonic condition of the atmosphere, which produces a sudden fall of temperature of several degrees. In the United States cold waves usually come from the northwest, but in some localities they may come from other directions. They are generally characterized by a high barometer and a clear atmosphere. Sometimes they extend so far south in the spring as to cause great damage to the fruit crop. The most extensive cold waves are caused by a large area of high pressure, which seems to cover the earth with a blanket of cold air. The Weather Bureau is able to predict cold waves twenty-four or thirty-six hours in advance of their arrival. The signal indicating their approach is a white flag with a large black square in the center. See CLIMATE; WEATHER BUREAU.

COLEOPTERA, *ko le op'te rah*. See BEETLE.

COLERIDGE, SAMUEL TAYLOR (1772–1834), an English poet, associated with Wordsworth in the production of the *Lyrical Ballads* at the beginning of the Romantic Period. Coleridge was born at Ottery Saint Mary, in Devonshire. From his childhood he was a voracious reader, and such books as the *Arabian Nights*, which he read as a child, undoubtedly influenced the course of his genius. He entered Cambridge University, but did not remain to graduate, and shortly after leaving the university he became interested with Southey in a scheme for founding an ideal community on the banks of the Susquehanna. As no unmarried people could join this community, Coleridge and Southey married in 1795, sisters, but their scheme went no further than this, as they had no funds to carry it out.

In 1796 Coleridge took a cottage at Nether Stowey in Somersetshire, and here he lived for two years as a neighbor of Wordsworth and his sister. The two young men, with Dorothy Wordsworth, took long rambles, and together they planned the *Lyrical Ballads*, which appeared in 1798. Coleridge's most notable contribution to this was *The Ancient Mariner*. In the same year he traveled in Europe with Wordsworth, and on his return he settled in Keswick. In 1804 he went to Malta, thinking to gain some relief from the rheumatism, but returned two years later without having benefited his health. To gain escape from his rheumatic pains, he had taken to opium, and the habit rapidly mastered him. Unable to fight against it alone, he lived from 1816 until his death chiefly with Doctor Gillman in London, leaving his family to the care of Southey. He was to a certain extent successful in mastering the habit, but it had seriously impaired his ability to work and his powers of concentration, never great, and he produced little that was noteworthy during his later years. Coleridge's conversational abilities were great, however, and during these years in London he was the center of a group of young men who met once a week to hear him talk.

All the poetry for which Coleridge is most celebrated, *The Rime of the Ancient Mariner*, *Christabel* and *Kubla Khan*, was written in a little over a year. Few poets have attained so high a place with so small a body of work; yet the wonderful melody of his verse, its imagery, its fancy, its suggestiveness, entitle him to rank with the truest of English poets.

COLE'RIDGE-TAY'LOR, SAMUEL (1875–1912), a modern English composer, of African descent. He studied at the Royal Academy from 1890 to 1896, achieving distinction as a composer. His most important work was a musical setting for the wedding scene of Longfellow's *Hiawatha*. He composed music for some of Stephen Phillips'

dramas, and wrote a sacred cantata, *The Atonement,* besides numerous songs, ballads and orchestral compositions.

COLFAX, *kole'faks,* SCHUYLER (1823–1885), an American statesman, born in New York City. He became prominent as a Whig editor in Indiana and was elected to Congress in 1854, serving until March, 1869. From Dec. 7, 1863, to March 4, 1869, he was Speaker of the House, and was elected on the Republican ticket Vice-President of the United States in 1868. During his incumbency of that office he was accused of complicity in postal frauds and the Credit Mobilier scandal, but nothing was proved against him. See CREDIT MOBILIER.

COLIC, *kol'ik,* a cramping pain in the stomach or intestines. It is a common ailment of babies, especially during their first six months of life. The most frequent cause is taking food into a stomach which has not rested sufficiently from a previous feeding. That is, too frequent feeding should be avoided. In some cases of colic the pain is caused by gas in the stomach or intestine. If the gas is in the stomach relief may be given the baby by holding him upright or lying him on his stomach. A change of position or trotting the baby sometimes helps intestinal colic. Better measures than these are a hot bath, a hot-water bag applied to the abdomen, and a cloth dipped in turpentine applied to the same place. According to Holt, a baby one month old may safely be given one minim (smallest possible drop) of paregoric; one three months old, two minims; one a year old, from five to ten minims. Some physicians believe that castor oil is harmful in colic cases. Rubbing the baby's back from waist upward is recommended as a preventive.

COLIGNY, *ko leen'ye,* GASPARD DE (1517–1572), a French admiral and Huguenot leader, who won distinction in the wars of Francis I and Henry II. He was made admiral in 1552. After the death of Condé, he became commander in chief of the Huguenots, and on the night of Saint Bartholomew's Day he was put to death. See BARTHOLOMEW'S DAY, SAINT.

COLLATERAL, *kah lat'er al,* in business and law, is anything of value pledged as security for the performance of an act, such as jewelry pledged as guarantee of payment of a sum of money to a private individual or bonds held by a bank as security for the payment of a loan. Collateral must be something which can be readily converted into cash in case the debtor fails to meet his obligation. In such event he loses the property deposited as collateral, unless from its sale the creditor realizes more than the amount due him. Such residue would be returned to the debtor, less costs involved.

COLLEGE, a term embodying several meanings, but applied most commonly in North America to an educational institution of higher rank than a high school or academy, but not so broad in scope as a university. As the term is understood in the United States, a college may be a part of a university, or it may be an independent unit. For instance, the university is generally made up of a college of liberal arts and various professional schools, as is true of the state universities, but an independent school giving instruction in literature, history, science, etc., without having special professional schools or departments, is properly a college. This distinction is shown by comparing Radcliffe College with Harvard University and Barnard College with Columbia University. In each instance the colleges are women's schools of liberal arts affiliated with the larger institutions.

Canadians use the term in much the same way, but apply it more loosely. Some Canadian high schools and academies are called colleges, and a high school of first rank in Canada is occassionally called a *collegiate institute.* It often happens, too, that the college belonging to a particular university is located in a different city from the main institution. For example, McGill University of Montreal maintains colleges in Victoria and Vancouver, B. C.

COLLIE, *kol'i,* a variety of dog especially common in Scotland, because of its intelli-

COLLIE

gence of much use to shepherds. The collie will take a flock of sheep to pasture, keep them together, protect them from wolves and

bring them all back safely at night. This dog is of medium size and varies much in coloring. Black and white collies are common, and those with black bodies and tan-colored legs are thought to be particularly handsome. The collie's head is somewhat fox-shaped, his ears are erect, but having drooping points, and his tail is rather bushy, with a strong curl upward. Collies are household pets in various countries.

COLLINGWOOD, Ontario, in Simcoe County, on Georgian Bay and the Grand Trunk Railway, ninety-five miles northwest of Toronto. It is the headquarters of the Northern Navigation Company, whose shipyards and drydock are located here. Steel ships are built here. The leading industries include tanneries, flour mills, lumber mills, brick yard and broom factory. The town has an extensive lumber and grain trade and is connected by steamer with Owen Sound, Mackinac, Sault Ste. Marie, Duluth and other ports. There is a separate school for Catholics, a collegiate school, a museum, an armory and a Y. M. C. A. Population, 1916, 7,700.

COL'LINS, William (1721–1759), an English poet. While studying at Oxford he wrote his Persian *Eclogues*, and in 1746 he published his *Odes, Descriptive and Allegorical.* Although this volume was unsuccessful, it contained some lyrics which entitle Collins to high rank among eighteenth-century poets. Best known of his poems are the *Ode on the Passions*, the *Song from Cymbeline* and the ode beginning "How sleep the brave who sink to rest."

COLLINS, [William] Wilkie (1824–1889), a well-known English novelist whose fame rests on his brilliant and well-constructed detective stories. He was a friend of Dickens, who had much to do with his decision to devote himself to literature rather than to the law, for which he had been educated. Among his best-known works are *Armadale, After Dark, The Woman in White, The New Magdalen, The Evil Genius* and *The Moonstone.*

COLLO'DION, a substance prepared by dissolving gun cotton in ether, or in a mixture of ether and alcohol, which forms a useful substitute for adhesive plaster in the case of slight wounds. When the fluid solution is applied to the cut or wound, it immediately dries into a semitransparent, tenacious film, which adheres firmly to the part, and under it the wound or abrasion heals without inflammation. In a slightly modified form collodion is also employed as the basis of a photographic process called the *collodion process.* The common small toy balloons are made of collodion. A solution of it is poured into a flask, which is then rolled around so that the collodion will form in a coating of equal thickness over the inside: then the air is exhausted from the flask and the collodion film pulls off and is easily removed.

COLOCASIA, *kol o ka'shi a*, a genus of plants, native of the East Indies, whose tubers contain much starchy matter which is used as a food after the acrid juice has been separated by boiling or washing. In the Pacific Islands the colocasia is called *taro;* in Hawaii, *poi;* in Japan, *satoimo;* in China, *yu-tao* and in Central America, *oto.*

COLOGNE, *ko lone'*, a city of Rhenish Prussia, on the left bank of the Rhine, forming, in connection with Deutz, a fortress of the first rank. There are many fine old buildings, as well as excellent modern ones, but the most important edifice of all is the cathedral (see below).

The manufactures embrace sugar, tobacco, glue, carpets, leather, machinery, chemicals, pines in the Pacific; the same year the Cologne water. Cologne was one of the most important members of the Hanseatic League and one of the most populous cities of Europe until the sixteenth century, when a decline set in. With the nineteenth century, progress began. In 1910 the city had a population of 516,167, and in 1918, according to an official estimate, this had increased to 671,220, making the city fifth in size in Germany. In 1918, in accordance with the armistice terms imposed by the allies, Cologne was occupied by allied forces. See World War.

Cologne Cathedral, one of the finest specimens of Gothic architecture in the world. It was begun in 1248 and was not completed until 1880. It is in the form of a cross 444 feet long, and has two enormous towers, the loftiest church towers in the world, each 512 feet high. The roof is 200 feet high and has a central tower 350 feet high. In the interior are pillared aisles, beautiful altars, mosaics, paintings, statuary and magnificent windows of stained glass. In the treasury are kept very many valuable jewels, precious stones and many sacred relics.

COLOMBIA, at the northeastern extremity of South America, is a republic, fifth in area among the countries of that continent. Previous to 1902 it included in its area the present republic of Panama; geographers now class the latter as a part of the North American continent. The exact area of Colombia is uncertain, but it is about 468,000 square miles, and the population is 5,072,600—only about eleven people to the square mile. This estimate of the number of people does not include practically uncivilized Indians, who number possibly 40,000. The language of Colombia is Spanish (see DEMARCATION, LINE OF). The country was named in honor of Christopher Columbus, and has been inhabited by white men, at first few in number, almost from the time Europe was able to take advantage of the discovery of the continent. The capital city is Bogota (which see).

Surface and Drainage. The surface is very mountainous. The Andes, entering from Ecuador, divide in southwest Colombia into three branches, namely, the west range; the central range, which has the highest peaks in Colombia, including the volcanoes Tolema, 18,000 feet high, Huila and Purace; the eastern range, a continuation or branch of the central, from which it is separated by Magdalena River. This chain divides in the north, the eastern extending into Venezuela, and the western extending northward, joining the Sierra Nevada de Santa Marta near the coast. There are many rivers, the chief of which is the Magdalena, which has a length of 1,000 miles and is navigable for almost 850 miles. The tributaries are the Cauca and the Atrato, the Meta and the Guaviare, the latter two tributaries of the Orinoco, and the Negro and Japara, both affluents of the Amazon.

Climate. The climate varies in different parts. The coast plains are generally hot and damp, while the central plateaus and high tablelands have a pleasant and healthful climate and abundant rains. In the southwest portion the plains are exceedingly dry.

Mineral Resources. Colombia is rich in minerals. The mountainous regions abound in gold and silver. The chief center of gold mining is Antioquia; of silver, at Tolima and Cauca. The annual output of gold and silver amounts to $4,500,000. Iron, copper, lead and salt are also found to some extent. Emeralds of an exceedingly fine quality are mined in the State of Boyaco. There is a good deal of coal, but as yet it has not been mined to any considerable extent.

Agriculture. There is a vast area of good soil, but only a small portion is under cultivation. Agriculture is the chief industry, but most of it is yet carried on by primitive methods. Coffee, tobacco and sugar cane are grown in the hot regions, and wheat, corn and barley in the more temperate parts. In the deep forests vegetation is very luxuriant. The banana tree is found in most parts, and that fruit is an important article of export. So inadequate is transportation that it costs more to bring wheat to the coast towns from the interior than to bring it by vessel from the United States.

Transportation. There are not many railroads, owing to the mountainous character of the country; in 1918 there were but 700 miles in operation. The absence of good country roads, most of them being merely beaten tracks, is partly compensated for by the many navigable rivers. Many steamboats ply the Magdalena.

Education. Education is largely maintained by the state. Besides the public schools, there are a university at Bogota (founded in 1572), a national institution for workmen and a school of arts and trades. The elementary schools are free, but attendance is not compulsory. Seventy-three per cent of the people are unable to read; Indians and negroes comprise most of this total.

Government. The President and Vice-President are chosen for six years by an electoral college. There is a Council of State of six members. The Congress consists of two houses, a Senate of thirty-five members, and a House of Representatives of ninety-two members. Each of the fourteen departments into which the republic is divided has a governor appointed by the President and an assembly elected by the people.

History. In 1536 the united forces of the Spaniards overcame the Indians who dwelt around this region, and after this Spanish

settlements rapidly grew up. In 1740 a viceroyalty under the name of New Granada was formed, comprising the present Colombia. In 1811 an insurrection against Spain broke out, and nine years later independence from Spain was secured. In the same year New Granada and Venezuela united to form the republic of Colombia, and Ecuador joined later; but this union lasted only until 1831, when the republic of New Granada was formed. There followed revolutions and political strife, with frequent changes in the constitution, until 1861, when a federal constitution was adopted and the name was changed to the United States of Colombia. In 1886 the present centralized republic was formed, the states now becoming Provinces. The Province of Panama broke away in 1903, and formed a republic (see PANAMA, REPUBLIC OF).

Colombia was strictly neutral during the first four years of the World War. The entry of the United States into the struggle did not at once elicit Colombia's sympathy, as was true of some other South American states, for it was still angry because of the loss of Panama. However, in 1918 it was found that the sentiment of the people was largely with the entente allies.

COLOM'BO, the capital of Ceylon, on the west coast of the island. The city is of great commercial importance, owing chiefly to its immense breakwater, sheltering 500 acres of water. Colombo is the center of the tea and cocoanut industry. Population, 1911, 211,284.

COLON, *ko lon'*, a seaport of the Republic of Panama, on Manzanillo Island, on the north coast of the Isthmus of Panama. It is at the Atlantic end of the Panama Canal, and is also the terminus of the Panama Railway. The city was founded in 1850, and then named Aspinwall, in honor of a New York financier, who was chiefly responsible for the construction of the first railway across the isthmus; later it was renamed Colon, for Christopher Columbus. The land on which the city is built belongs to the Panama Railway, under the terms of its original franchise, and the railway is now the property of the United States government. Adjoining Colon, on Limon Bay, is the American town of Christobal, where have been located great refrigeration plants and railroad shops.

The harbor of Colon, which is deep but exposed, has been improved by the erection of a long breakwater, and the city is now a port of call for over a dozen lines of steamers. Unlike most Central and South American ports, it has good docks and piers, at which steamships may take on and discharge cargoes. Although Colon, for purposes of government, is in Panama, all matters of sanitation and quarantine are under the control of the United States. The city was formerly extremely unhealthful, but United States sanitary engineers under General Gorgas made it entirely safe as a place of residence. Population, 1911, 17,748; in 1918, estimated, 26,000.

COLON, *ko'lohn*, a portion of the large intestine, consisting of three parts, known as the *ascending*, *transverse* and *descending* colons. The colon tube begins on the right side of the abdominal cavity where the small and large intestines join, and ends in the lower left side of the abdomen, where it communicates with the rectum. See illustration, accompanying the article ABDOMEN.

COLONEL, *kur'nel*, a military officer in command of a regiment. He ranks next below a brigadier-general and above a lieutenant-colonel, who is above a major. In peace times for many years the pay of a colonel in the United States army was $3,500; when overseas duty was imposed in the World War the compensation was raised to $4,000. The colonel has rank corresponding to a captain in the navy. He wears a silver eagle with spread wings on his shoulder strap as the insignia of his rank. See ARMY; RANK.

COLONIES AND COLONIZATION. A colony, in a strict sense, settlement formed in one country by the inhabitants of another, but now it is used loosely to describe a territory distant from, but dependent upon, another country. The ambition to extend territory, the desire to increase wealth, and, latterly, the necessity of providing an outlet for the surplus population of Europe, have been the chief motives in colonization.

Portuguese Colonies. The Portuguese were the first great colonizers among modern states. In 1419 they discovered Maderia, the Azores and the Cape Verde Islands; soon after they reached the Congo and the Cape of Good Hope, and before 1500 Vasco da Gama had landed at Calicut, in India. The first Portuguese colonies were garrisons along the coasts where traders stopped, but real colonies were established in Ceylon in 1505

and in the Moluccas in 1510. Brazil was discovered in 1499, and it fell to Portugal by the Bull of Demarcation and was colonized about 1530. Bad government at home and the subjection of the country to Spain caused the loss of most of the Portuguese colonies. The Portuguese now possess several territories in India, China and the Indian Archipelago. In Africa they possess the Cape Verde Islands, settlements along the coast and other islands amounting in area to about 700,000 square miles.

Spanish Colonies. Soon after the Portuguese, the Spaniards commenced the work of colonization. In 1492 Columbus discovered the island of San Salvador. Hayti, or San Domingo, Porto Rico, Jamaica and Cuba were soon colonized; before the middle of the sixteenth century Mexico, Ecuador, Venezuela, New Granada, Peru and Chile were subdued, and Spain took first rank among the colonizing powers of Europe. But the Spaniards never really attempted to develop the industrial resources of the subject countries. The pursuit of mining for gold or silver occupied the colonists almost exclusively, and the enslaved natives were driven to work themselves to death in the mines. Cities were founded, at first along the coasts, for the sake of commerce and as military posts, and afterwards in the interior. The colonial intercourse with Spain was confined to the single port of Seville, afterward to that of Cadiz. When the power of Spain declined, that country lost most of its colonies. At the close of the Spanish-American War the Philippines and Porto Rico were ceded to the United States and Cuba became an independent republic—The Ladrone Islands were sold to Germany in June, 1899, and Spain now owns only a few small places in India and Africa.

Dutch Colonies. The ill-will of Philip II, who excluded Dutch vessels from the port of Lisbon, forced the Dutch to import directly from India or lose the large carrying trade they had acquired. Several companies were soon formed, and in 1602 they were united into one, the Dutch East India Company, with a monopoly of the East India trade and sovereign powers over all conquests and colonies in India. The Dutch rapidly deprived the Portuguese of nearly all their East Indian territories, settled a colony at the Cape of Good Hope (1650), established a West India Company, made extensive conquests in Brazil (1623–1660), which were soon lost, and more permanent ones on some of the smaller West India islands. The growing power of the British and the loss of Holland's independence during the Napoleonic wars were heavy blows to the colonial power of the nation. But the Dutch still possess numerous colonies in the East Indies, among which the more important are Java, Sumatra, Dutch Borneo, the Molucca Islands and part of New Guinea; they also possess several small islands in the West Indies, and Surinam.

British Colonies. No other colonizing power of Europe has had a career of such uniform prosperity as Great Britain. The English attempts at colonization began nearly at the same time as the Dutch. After many fruitless attempts to find a northeast or northwest passage to the East Indies, English vessels found their way round the Cape of Good Hope to the East Indies in 1591. The East India Company was established in 1600. The ruin of the Mogul Empire in India after the death of Aurengzebe (1707) afforded the opportunity for the growth of British power, as the British and French were compelled to interfere in the quarrels of the native princes and governors. By the victory of Clive at Plassey in 1756, France was practically driven from India, and England laid the foundation of an exclusive sovereignty there. By the middle of the nineteenth century the British territory embraced nearly the whole of India; which was still under the government of the East India Company—a mercantile company, controlled, indeed, by Parliament, but exercising many of the most important functions of an independent sovereignty. On the suppression of the Indian mutiny (1857–1858) the government of India was transferred to the Crown by act of Parliament in 1858.

The discoveries of the Cabots, following soon after the voyages of Columbus, gave the English Crown a claim to North America, which in the reign of Elizabeth led to colonization on a large scale. Raleigh's settlement on Roanoke Island (North Carolina) in 1585 failed to become permanent, but in 1607 the colonists sent out by the London Company to Chesapeake Bay founded Jamestown in Virginia. The next great settlement was that of the Pilgrim Fathers, who landed December 21, 1620, in Massachusetts Bay. The colonization of New

Hampshire, Maine, New Jersey, Connecticut, Rhode Island, Maryland, Pennsylvania, the Carolinas and Georgia followed within a century, and, meanwhile, New Amsterdam was seized from the Dutch, and its name was changed to New York. Colonies were early established in the West India islands; Newfoundland was taken possession of in 1583 and colonized in 1621; Canada was surrendered to Britain by the Treaty of Paris in 1763. In 1764 began the disputes between Great Britain and its North American colonies, which terminated with the acknowledgment of the independence of the United States, Canada still remaining a British dependency.

Australia was discovered in the beginning of the seventeenth century. The first settlements of Britain there were penal colonies, the first being established in New South Wales about 1770. In 1851 the discovery of the abundance of gold in Victoria gave a great impetus to the prosperity of the Australian colonies. Australia is now a Commonwealth, entirely self-governing, but an important part of the British Empire. In 1874 the Fiji Islands, and in 1884 part of New Guinea, were annexed as crown colonies. In South Africa, Cape Colony, first settled by the Dutch in 1652, became an English colony in 1814, and English influence there has since been steadily expanding, now extending over a large part of South, East and North Africa. In Europe Great Britain has a few colonies acquired for military reasons —Gibraltar in 1704, Malta and Gozzo in 1800. It is estimated that the existing British colonies and dependencies embrace about one-sixth of the land surface of the globe and nearly the same proportion of its population.

French Colonies. *France* was somewhat late in establishing colonies. Champlain was the pioneer of the French in the exploration of the North American continent and founded Quebec in 1608. Colbert purchased several West India islands, as Martinique, Guadeloupe, Saint Lucia, and sent out colonists in 1664 to Cayenne. In 1670 the East India Company, formed by Colbert, founded Pondicherry, which became the capital of extensive possessions in the East Indies. At the beginning of the eighteenth century *France* had settlements in Canada, Nova Scotia and Newfoundland and the most flourishing of the West India islands, and the country seemed to have a prosperous career before it in India. Before long, however, the rival interests of British and French colonists brought about a conflict, which terminated in the loss of Canada and other North American possessions, as well as many of the West India islands and a large part of India. *France* has colonial possessions at present in India, Cochin-China and southeastern Asia, New Caledonia, and other islands in Oceania, in Africa and in the West Indies.

Other Colonies. Within recent years *Germany* made an effort to take rank as a colonial power, and it acquired territories in Africa and in the islands of the Pacific, as well as posts in China. All these were taken from that country in the early part of the World War by the British, Japanese and Australians. *Denmark's* northern dependencies, Greenland and the Faroe Islands, though of considerable extent, are of small value; Iceland is practically independent. In the West India islands Denmark had Saint Thomas, Saint Croix and Saint John until 1917, when the Danish West Indies were sold to the United States, and renamed Virgin Islands.

Since the late nineteenth century the *United States* has taken rank as a colonizing power, having gained in 1898, by the Spanish-American War, the island of Porto Rico in the Caribbean Sea and the Philippines in the Pacific; the same year the Hawaiian Islands were acquired by annexation, and since that time other small islands and coaling stations have been added. The latest acquisition is the Virgin Islands (which see).

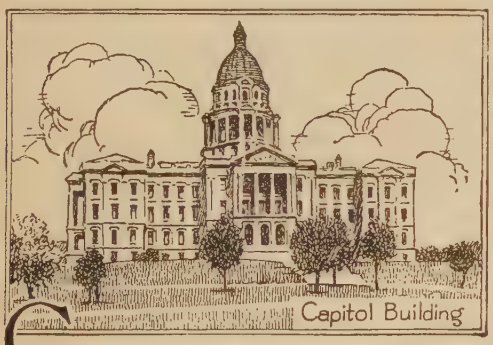
Related Articles. For further details see, in the articles on the countries mentioned, the subhead Colonies.

COLOR, *kul'ur,* the name used to distinguish the different sensations that lights produced by various rates of vibration give to the eye. White is composed of seven colors, violet, indigo, blue, green, yellow, orange and red. These are known as the *prismatic* colors (see LIGHT, subhead *Spectrum*), and all other colors are produced by combinations or modifications of the prismatic colors. The color of bodies is due to their different powers of reflecting light. A red body reflects the red rays and absorbs all the others; a blue body reflects only the blue rays; a green body, the green, and so on.

The *primary* colors are those from which

all other colors can be made by mixing. They are blue, yellow and red. The remaining prismatic colors are known as *secondary*, because they can be produced by mixing two of the primary colors, as blue and yellow produce green; red and yellow, orange, and blue and red, violet or indigo, according to the quantity of red used. *Complementary* colors are those which, when mixed, produce white; any one of the primary colors is a complementary color when mixed with the other two.

In the scientific sense of the word, white and black are not considered colors. A white body reflects all the rays, and the black body absorbs all without separating them. This, however, is only theoretical. In all cases some rays are absorbed and some reflected.


Capitol Building

COLORADO, *kahl o rah'doh*, the thirty-eighth state in the Union. It was admitted August 1, 1876, and is known as the CENTENNIAL STATE. Millions of people think of Colorado as belonging to the far west, although the eastern boundary is only two hundred miles west of the geographical center of the United States. Colorado is nearly twice as large as the combined area of the New England States and is larger than Great Britain. It is about the same size as Italy. Its area is 103,948 square miles, and it is about 380 miles long and 280 miles wide. The Federal estimate for 1918 gives Colorado a population of 1,005,000; in 1910 it was 975,190.

Surface and Drainage. The surface of Colorado is naturally divided into three parts. The eastern part consists of the great plains extending from the eastern boundary to the foothills of the Rocky Mountains. These plains vary in height from 4,000 to 6,000 feet. The foothills constitute a belt of land stretching along the Rocky Mountains from fourteen to forty-five miles wide. To those who have not seen the towering mountains, the title of foothills seems strange because the altitude varies from 6,500 to 9,000 feet. The third division includes the Rocky Mountains proper.

The Mountains are naturally divided into two main ranges—the eastern and the western. Various branch ranges are also important. Colorado is famous for the large number of lofty peaks and the grandeur of her mountain scenery. There are within the state more than 140 peaks with an altitude of 13,000 feet, and forty-five are 14,000 feet high. Mount Massive (14,424), situated in the southern part, is slightly the highest mountain in Colorado and second in the United States. Pikes Peak (14,108) is the most celebrated. Its summit is reached not only by a mountain railroad but also by one of the most wonderful automobile roads in the world.

Between the various ranges of mountains and their towering peaks is included that part of the state known as the Rocky Mountain Parks. A Park in the Rocky Mountains consists of open grass land which is generally level or undulating. The common idea of a park with trees does not apply. The altitude varies from 7,800 to 9,200 feet. San Luis Park is larger than Massachusetts. South Park is the smallest, and it is nearly as large as Rhode Island. There is also a North Park and Middle Park.

In the mountainous part of the state the rivers are usually rushing torrents, pouring their waters down from the melting snow of the many lofty peaks. The principal rivers are the South Platte, the Arkansas, the Rio Grande, the Grand, the Yampa, the White, the Green, the Eagle, the Gunnison, and the Uncompahgre. On the great Continental Divide rivers whose waters reach the Atlantic Ocean and rivers whose waters reach the Pacific often have their sources within a mile or so of each other.

Climate. Reports concerning Colorado climate are very confusing to Eastern people. This is due to varying elevations, to the presence or absence of moisture in the different parts of the state, and to the remoteness or proximity to high mountains. The United States authorities divide Colorado into five zones of temperature. In these zones the annual average temperature varies from 35° or less in the high altitude to 50°

or higher in the Arkansas valley and in the protected valleys of the mountains.

The climate is healthful, dry, and invigorating. In all parts of the state there is an abundance of sunshine; in an average year there are at least 300 clear days. Fog in Colorado only occurs about once a year in the western part of the state, about three times a year in the eastern foothills, and somewhat more frequently in the eastern portion of the state. The summer sun is frequently very hot, but prostration from heat is practically unknown.

Colorado is not a rainless district, as sometimes reported. The annual rainfall in the mountains varies from fourteen to twenty-five inches. The eastern or plains section has about fifteen inches. On the plateaus of the western slopes most of the rain falls in winter, but on the Great Plains and on the eastern slopes the greater part falls in the summer. The annual snowfall varies from twenty inches in the Arkansas Valley to 220 inches on the high western slopes of the Rocky Mountains.

Mineral Resources. From the time of the Louisiana Purchase various reports were made concerning the discovery of gold in the Rockies, but no definite operations were undertaken until 1858. From that time until the present day the leading industry of Colorado has been mining for some of the precious metals. The total production of gold, silver, copper, and lead has amounted to more than $1,000,000,000. Even during the war period for 1918 the total production of precious metals amounted to $43,436,750. For the year 1917 it was $6,000,000 more. The production of gold alone in 1918 reached nearly $13,000,000. Recently several other minerals such as molybdenum, tungsten, manganese, fluorspar, and other materials used in making war steel have been discovered in large quantities. The output of radium for 1918 was $2,500,000.

Colorado ranks fourth among the states of the Union in available coal supply. The other states surpassing Colorado in possible coal supply are Wyoming, South Dakota and Montana. According to the United States Geological Survey, the coal area covers 17,000 square miles and contains a possible supply of 317,589,600,000 tons. All varieties of coal are found. Anthracite is found in Gunnison and Routt Counties. More than 10,000,000 tons of coal is being mined annually in the state. This is less than one-tenth of one per cent of the available supply.

Oil has been found in paying quantities in different parts of the state, especially at Florence.

Agriculture. Colorado's annual agricultural wealth amounts to over $150,000,000. The scientific cultivation of the semi-arid plains under what is called dry farming has recently greatly increased production. The mountain streams fed by the melting snow are being used for the irrigation of more than 3,000,000 acres; it is estimated that there is still available water for the irrigation of 3,000,000 acres more.

The variety of agricultural products is practically unlimited. The leading ones in order of money value are hay, wheat, corn, sugar beets, potatoes, beans, oats, barley, field peas, peaches, apples, forage crops, broom corn and vegetable seeds. Fruit may be produced in almost any locality having an altitude of less than 6,000 feet, but the western slope leads in the production of fruit, especially peaches and apples.

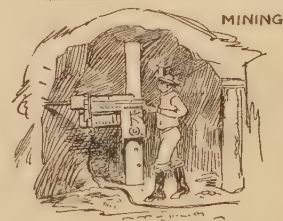
Manufactures. In 1918 the output of Colorado's factories was approximately $210,000,000. Smelting and refining take the lead of all manufacturing industries, but there are many other important factories. The manufacture of iron and steel, tin and copper, stoves, cars, and car wheels, rubber goods, automobile supplies, leather, soap, flour, brick and pottery are among the industries of the state. The steel works at Pueblo employ about 8,000 men.

All the conditions in Colorado combine to insure a great future in the manufacturing industries of Colorado. It has an unlimited supply of coal, ores are produced in Colorado, all forms of building material are here, and the possible supply of electric power by utilizing the mountain rivers is almost unlimited. On the other side of the Front Range the Grand River has been turned for several miles through a tunnel in the mountains; this gives an enormous waterfall which will produce great electrical power for all time to come. Denver receives its electric supply from this equipment.

Railroads. The first railroad in Colorado was the Union Pacific, built from Denver to Cheyenne in 1870. So rapid has been the development since then until now the state has nearly 6,000 miles of railroads. Denver is the center of the railway system. The

COLORADO

"CENTENNIAL STATE"



Items of Interest on Colorado

The greatest mountain "parks"—North, Middle, South, Estes and San Luis—form a remarkable feature of the state; these are great plateaus, partly level meadows, partly forests, partly mountainous, generally lying just east of the Continental Divide.

The timber line on the mountains is about 10,000 feet, and the snow line about 11,000.

Large game is still abundant west of the Continental Divide and in the great parks; deer, elk and antelope, grizzly, brown and black bears are the most common.

There are about 12,000 miles of irrigation canals, which water nearly three-fourths of the improved farm lands; Colorado leads the Union in the total area under irrigation.

The Cripple Creek district, which includes the largest gold mine in the United States, is one of the richest gold fields in the world.

The coal fields are the richest west of the Mississippi; Colorado now ranks seventh as a producer of coal and coke.

Questions on Colorado

What is the area of Colorado?

Name the principal mountain ranges.

What are the three great physical divisions?

What are some of the best-known mountain peaks?

What are the "parks"?

Name four large rivers which have their sources in the state.

What can you say of the climate?

What large game is still abundant?

How does Colorado rank as a producer of beet sugar?

What are the principal mineral deposits?

What manufacturing industries are most important?

How many miles of railway are there in the state?

When were women granted the suffrage?

For what are Cripple Creek and Leadville noted?

mountain railroads extend through the most beautiful scenery in the world. Their construction is an exhibition of the greatest in modern engineering skill.

Government and Education. The government is similar to that of most of the western states. The members of the senate are elected for four years and those of the house of representatives for two years. The governor is elected every two years. A supreme court consists of the chief justice and seven associate justices. In 1912 a constitutional amendment was adopted providing for the recall of all elective offices. Colorado was among the very first states to adopt woman's suffrage. State prohibition became effective in 1916.

The University of Denver is the pioneer institution of higher learning in the state, founded as the Colorado Seminary in 1864. The University of Colorado at Boulder, the School of Mines at Golden, the Agricultural College at Fort Collins, the State Teachers' College at Greeley, the State Normal School at Gunnison, are all well supported and flourishing educational institutions. Colorado College at Colorado Springs is a private institution of high rank.

History. The name of the state, taken from that of the Colorado River, signifies *red water*. The country was visited by Spanish adventurers in the sixteenth century, but was not settled. By the Louisiana Purchase the United States gained possession of about half of the territory of Colorado and the remainder was acquired from Mexico by the Treaty of Guadalupe-Hidalgo. It was explored by Zebulon Pike in 1806 and by Fremont in 1843. The discovery of gold in 1858 was followed by settlement in the regions of the mines, and Denver and Boulder were established. In 1861 the territory Colorado was organized from portions of Kansas, Nebraska, New Mexico and Utah, and after two acts for its admission as a state had been vetoed, it finally was admitted in 1876. Recent progress is indicated in the paragraphs above.

Related Articles. Consult the following titles for additional information:

Boulder	Greeley
Colorado Springs	Parks, National
Cripple Creek	Pike's Peak
Denver	Pueblo
Fort Collins	Royal Gorge
Garden of the Gods	Trinidad

COLORADO, UNIVERSITY OF, an institution of higher learning at Boulder, incor-

porated by the territorial legislature in 1861. In 1876 the constitution of Colorado provided for its erection as a state university. It now comprises the college of liberal arts, the graduate school, the medical school, the school of law, the college of engineering, the college of commerce, the college of education, the school of pharmacy, the summer session, the university extension and the school of social and home service. There is a faculty of nearly 200, and the student enrollment is normally almost 2,000. The library contains about 100,000 volumes.

COLORADO RIVER, a river formed by the junction of the Green and Grand rivers in Utah, noted for the scenery along its course. Among the most wonderful natural objects in the world is the Grand Canyon of the Colorado in Arizona, through which the Colorado River runs for over 250 miles. The river flows southwest and south through Utah into Arizona, forming the boundary between Arizona on one side and Nevada and California on the other. After a course of about two thousand miles from the source of the Green River it empties into the Gulf of California. The basin of this river shows a most wonderful example of the erosive power of water. In its course the river receives many tributaries in deep canyons and valleys, and many of the minor tributaries have deep canyons like the main stream. See GRAND CANYON OF THE COLORADO.

COLORADO RIVER, a river of Texas, rising in the northwestern part of the state. It flows in a southeasterly direction through the state and empties into the Gulf of Mexico, through Matagorda Bay. The chief towns on its banks are Bay City, Austin, La Grange and Bastrop. It is 650 miles long and is navigable up to Austin, a distance of 200 miles. The river provides valuable power, and its waters are used in irrigating the districts in its valley.

COLORADO SPRINGS, COLO., founded in 1871 and now third in size among the cities of the state, is seventy-five miles south of Denver and forty-three miles north of Pueblo. It is on the Denver & Rio Grande, the Santa Fe, the Colorado & Southern, the Colorado Midland, the Chicago, Rock Island & Pacific and the Colorado & Cripple Creek railroads. The beautiful scenery and healthful climate of the vicinity has made this section one of America's most popular pleasure and health resorts. Some of the parks are world famous, particularly the Garden of the Gods (which see), containing 480 acres; other parks are North Cheyenne Canyon (300 acres), Monument Valley Park (200 acres) and Palmer Park (700 acres).

The important industries are gold reduction mills, art pottery works, brick plants and the bottling of mineral water. A Federal building was erected in 1909, and in the same year the city adopted the commission form of government. The Union Printers' Home, founded by George W. Childs (which see) is valued at $1,000,000; the Modern Woodmen of America's sanitarium was established in 1909 at a cost of about $1,000,000. Colorado College, the state school for the deaf and dumb and Saint Stephen's School (for boys) are in the city. There are several large hotels, a Masonic Temple and numerous costly residences. Colorado City was annexed in 1917. Population, 1910, 29,078; in 1917, including Colorado City, 38,965 (Federal estimate).

COLOR BLINDNESS, an optical defect which prevents the recognition of certain colors. It is incurable, may be partial or complete, and may affect one or both eyes. While this defect is sometimes suffered by persons whose vision is otherwise normal, irregular refraction very commonly accompanies color blindness. The most common forms are known as *green blindness*, in which the affected eye fails to recognize green, that color usually appearing as yellow; and *red blindness*, in which the eye cannot recognize red but sees it as a bright yellow or a pale yellow. Some eyes are so defective that they fail to recognize three colors, while occasionally one is found who can recognize only black and white. Color blindness may be inborn or acquired.

The continual straining of the eye in observing objects at long distances sometimes produces color blindness of the objects continually looked for, as in the case of trainmen on railways who have followed the road for a long time. These men frequently become color blind to red and green.

COLOR PRINTING. See PRINTING, subhead *Color Printing*.

COLOSSEUM, *kol o se'um*, a name given to the FLAVIAN AMPHITHEATER in Rome, a large edifice for gladiatorial combats, fights of wild beasts and similar sports. It was begun by Vespasian and finished by Titus, A. D. 80. The outline of the Colosseum is

elliptic, the exterior length of the building being 620 feet, its breadth, 513 feet, and its height, 157 feet. It is said to have seated 87,000 people and to have had standing room for 20,000 more. The arena, or central space, measured 280 by 176 feet and was enclosed by a low wall, a protection against the wild beasts. The flooring was of boards covered with red sand (*arena*) to soak up and conceal the blood. Underneath were rooms for housing men and animals.

The exterior of the building was decorated by three rows of columns, the first story with Doric, the next with Ionic and the third with

THE COLOSSEUM

Corinthian columns. Down to the sixth century this imposing building remained almost uninjured, but at that time Theodoric, king of the Goths, had material taken from it for the construction of various buildings. The ruins to-day show four stories on one side only. The name is derived from the colossal statue of Nero, which stood close by. During the World War patriotic celebrations in which Americans joined were held in this historic edifice.

COLOSSUS, *ko los'us,* in sculpture, the name for any statue of very large size. The Egyptians produced many excellent examples of colossal statuary. Among these the most celebrated were those of Amenophis III, one of which was the so-called *Memnon,* whose vocal powers were fabled as one of the wonders of ancient times. The Greeks produced the most artistic colossi, among which were the bronze statue of Pallas Athene, on the Acropolis of Athens; the statue of Athene of gold and ivory, in the Parthenon at Athens, and the Olympian Zeus, sculptured by Phidias. One of the seven wonders of the world was the *Colossus of Rhodes,* representing Helios, the sun god. It stood astride the entrance of the harbor of Rhodes, a bronze figure probably ninety feet high. The Romans followed the Greeks in this form of art and produced such colossi as the statue of Jupiter, on the Capitol, and that of Nero, 110 feet high, from which the near-by amphitheater derived its name of *Colosseum.* Among modern works of this nature are the *Germania* at Niederwald, on the Rhine; the statue of Peter the Great, at Petrograd, and the statue of *Liberty Enlightening the World,* New York (see LIBERTY, STATUE OF).

COLUMBIA, Mo., founded in 1821, is the county seat of Boone County, 144 miles west of Saint Louis, on the Wabash railroad and on a branch of the Missouri, Kansas & Texas system. The city is situated in a farming, fruit-growing and stock-raising district and has extensive flour and planing mills and manufactures of agricultural implements. The state university, the Missouri State Bible College, Christian College, Welch Military Academy and the state agricultural college are located here. Because of its educational importance the city is called the "Athens of Missouri." Columbia contains a monument to Thomas Jefferson, a state hospital, an agricultural experiment station and a weather bureau office. Population, 1910, 9,662; in 1917, 12,958 (Federal estimate).

COLUMBIA, PA., a city in Lancaster County, twenty-eight miles southeast of Harrisburg, on the Pennsylvania and the Philadelphia & Reading railroads and on the Susquehanna River. It is an important industrial center and manufactures boilers, machinery, cut glass, iron products, hardware, brushes and garments. Columbia was settled in 1726 by Quakers, and was known for many years as Wright's Ferry. It has two Catholic schools. Population, 1910, 11,454; in 1917, practically unchanged.

COLUMBIA, S. C., the capital of the state and its second city in size, and the county seat of Richland County, eighty-two miles northeast of Augusta, Ga., and 130 miles northwest of Charleston, on the Seaboard Air Line, the Southern, the Atlantic Coast Line and the Columbia, Newberry & Laurens railroads, and on the Congaree River. The city is in a cotton region, near extensive forests, and a canal from the river furnishes water power. The manufacturing of cotton products is the chief industry, there being six cotton mills; there are also four oil mills and three fertilizer plants. In

all, there are about eighty manufacturing establishments. The courthouse, the city hall, the statehouse, a new Federal building costing $265,000, and Y. M. C. A. and Y. W. C. A. buildings are noteworthy. There are business blocks of ten, twelve and fifteen stories in height. Columbia is the seat of the University of South Carolina, the Presbyterian Theological Seminary, the Columbia Female College (Methodist), the College for Women (Presbyterian), and Allen University and Benedict College, both for colored students.

It was settled about 1700 and remained small until the capital was moved here from Charleston in 1786. During the Civil War Sherman entered the city, February 17, 1865, and the following night three-fifths of the place was destroyed by fire. The city recovered rapidly after the war, and its recent development is a part of the general revival in the South. The commission form of government was adopted in 1910. Population, 1910, 26,319; in 1913 the annexation of a number of suburbs raised the total, in 1917, to 35,165 (Federal estimate).

COLUMBIA RIVER, one of the most important rivers in the United States, rising in the Rocky Mountains in British Columbia, flowing in winding course, chiefly through the United States, into the Pacific Ocean. Near its mouth it forms the boundary between Washington and Oregon. The salmon fisheries of this river are famous, and are the source of great wealth. The river is also noted for its beautiful scenery. Its chief tributaries are Clarke's Fork, the Spokane River and the Snake River. The Columbia River Highway (which see) a scenic road, has made the beauties of the Columbia familiar to thousands of visitors. The river is about 1,400 miles long, and it drains an area of 300,000 square miles.

COLUMBIA RIVER HIGHWAY, a notable scenic road built along the Columbia River. Work on it was begun in 1913, and it was opened to the public in 1916. The highway extends west from Portland, Oregon, to Seaside, on the Pacific Ocean, and east from Portland along three routes to the Sandy River, a distance of eight miles. The total length is sixty and one-half miles. It follows the course of the river over mountains, into valleys and around beautiful hills and runs through several tunnels. There was an effort in its construction to preserve the natural beauty of the surroundings. Some of the bridges and viaducts are hundreds of feet long, and within a distance of ten miles on one part of the route are eleven waterfalls.

COLUMBIA UNIVERSITY, in New York City, is one of the oldest educational institutions in the United States, and in point of student enrollment one of the largest in the world. During the period of 1916–1917, 20,234 students registered in all departments, including those attending only the summer session. The entrance of America into the World War cut these figures to 17,600 for 1917–1918, and leaves of absence were given to 200 instructors to engage in war work. In normal times the teaching force numbers more than 1,000. The university is equipped with a library of 675,000 volumes.

The main buildings of the university are grouped along Morningside Heights, overlooking Riverside Drive and the Hudson River. Barnard College (for women) and Teachers' College, allied corporations, are also on this campus, but the medical and pharmacy schools are on West Fifty-ninth and West Sixty-eighth streets respectively. The university comprises, besides these departments, Columbia College (undergraduate department for men), schools of

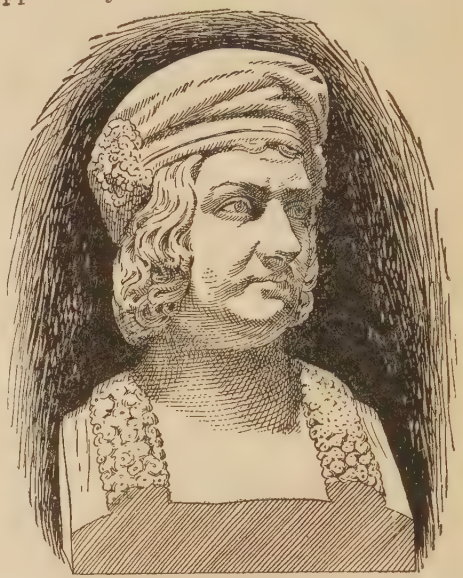
WILD COLUMBINE

law, science, architecture, journalism and business, graduate schools and the extension classes. Women are admitted to Teachers' College, the colleges of medicine and pharmacy, to the graduate schools of philosophy, pure science and political science, and to the summer school and extension classes.

The university traces its origin to King's College, for the establishment of which King George II granted a charter in 1754. Among the famous Americans who enrolled in this institution were Alexander Hamilton, John Jay, Robert L. Livingston and DeWitt Clinton. In 1784 the name was changed to Columbia College, and in 1896 the name Columbia University was adopted for the institution as a whole.

COL'UMBINE, the popular name of plants with five colored sepals and five spurred petals. The common columbine is a favorite garden flower and owes its name to the fancied resemblance of the petals to the form of doves, *columba* being the Latin word for *dove*. The columbine is the state flower of Colorado. In the United States several species grow wild and are known commonly, but erroneously, as honeysuckles.

COLUMBUS, CHRISTOPHER (1451–1506), the discoverer of America, whose first expedition to the New World, in 1492, marks the beginning of the modern era, and was an event of inestimable importance in the world's history. Columbus made his discoveries under the Spanish flag, but he was a native of Italy, and was born in or near Genoa. The correct form of his name is Christoforo Colombo. He was carefully educated and early in life he developed a taste for adventure and a desire for geographical knowledge. About 1470 he came into possession of maps and papers which confirmed his opinion that the continent of Asia could be reached by sailing westward. Already he had become acquainted with the principles of navigation and had had considerable experience as a seaman, on voyages to England, the Canaries, Guinea and perhaps Iceland. For years he worked unceasingly to gain financial support for his enterprise. He first went to wealthy individuals in Genoa, Venice and Lisbon, and then unsuccessfully implored the aid of King John of Portugal. He finally went to Spain, and for five years followed the court from place to place, pleading his cause at every opportunity.



CHRISTOPHER COLUMBUS
From a bust by an unknown sculptor, Capitoline Museum, Rome.

When almost disheartened by his many reverses, he stopped at a convent, La Rabida, where he accidentally met a well-known mariner, whose interest was at once aroused. A messenger was dispatched to the Spanish court, then encamped before Granada. The mission was successful, owing, probably to the brilliant termination of the war against the Moors, which ended in the fall of their great stronghold, Granada. By the aid of Ferdinand and Isabella, king and queen of Spain, he was enabled to start on a voyage to prove his theories, and on August 3, 1492, his small fleet—the *Niña*, the *Pinta* and the *Santa Maria*—set sail into an unknown sea.

The modern traveler, crossing the Atlantic in a week or so, and enjoying the comforts of the finest hotel, can little appreciate the perils of that voyage. Even more terrifying than the actual dangers of wind and wave were the superstitious fears of the sailors, for in those days the unknown seas were believed to be the abode of dreadful mon-

COLUMBUS

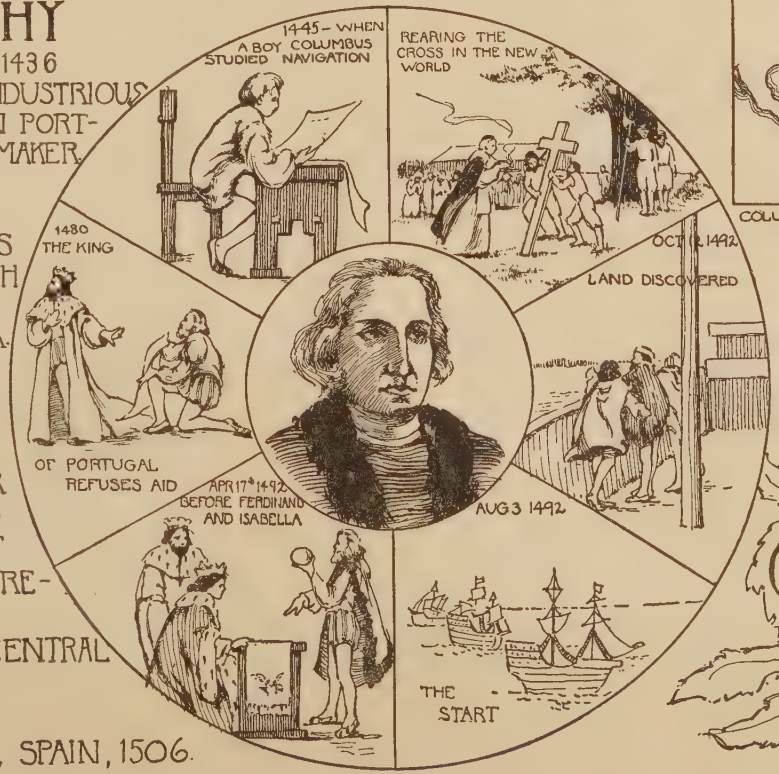
BIOGRAPHY

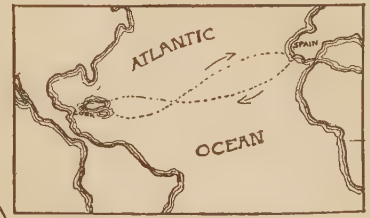
BORN: GENOA, ITALY, 1436
PARENTS POOR BUT INDUSTRIOUS
EARLY LIFE: SAILOR ON PORT-
-UGUESE SHIP. MAP MAKER.
CHARTOGRAPHER FOR
COURT OF SPAIN.
LATER LIFE: ADVOCATES
ROTUNDITY OF THE EARTH
MEETS MARCHENA AT
CONVENT OF LA RABIDA.
RECEIVES AID FROM
QUEEN ISABELLA.

VOYAGES

1–1492, SAN SALVADOR
2–1493, SAN DOMINGO
3–1498, COAST OF
SOUTH AMERICA RE-
TURNED IN CHAINS.
4–1502, COAST OF CENTRAL
AMERICA.

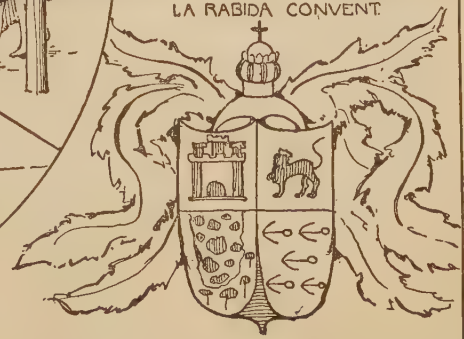
DIED; VALLADOLID, SPAIN, 1506.


1445 – WHEN A BOY COLUMBUS STUDIED NAVIGATION
REARING THE CROSS IN THE NEW WORLD
OCT 12 1492 LAND DISCOVERED
AUG 3 1492
THE START
APR 17th 1492 BEFORE FERDINAND AND ISABELLA
1480 THE KING OF PORTUGAL REFUSES AID



COLUMBUS'S ROUTE ACROSS THE SEA. 1492.

LA RABIDA CONVENT

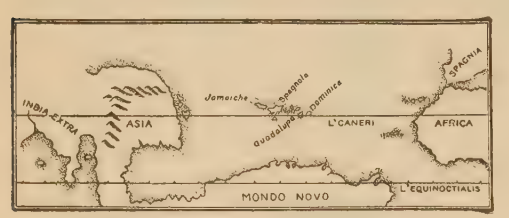


sters. Joaquin Miller has given us a suggestion of this in his inspiring poem, *Columbus:*

They sailed, and sailed, as winds might blow,
Until at last the blanch'd mate said;
"Why, now, not even God would know
Should I and all my men fall dead.
These very winds forget their way,
For God from these dread seas is gone.
Now speak, brave Admiral, and say—"
He said: "Sail on! and on!"

After weeks of suspense the little band sighted land, and on October 12 they landed on one of the Bahama Islands, which Columbus called San Salvador. On October 28 he reached Cuba, which he thought was a part of Asia, and on December 6 he landed on Hayti (called Española, or Little Spain). Believing that he had reached Japan, Columbus established a colony there, and named it La Navidad. In January, 1493, he sailed back to Spain to receive the praise of people and monarchs alike.

Three other voyages followed the first, on the third of which he discovered a number of islands and the mainland of South America. His colonization schemes in Española, however, did not turn out well, and he had,



MAP OF THE WORLD
Made by Bartholemew Columbus, brother of Christopher, in 1502.

moreover, become an object of envy and the victim of petty intrigue. In fact, he was sent home in chains on the third expedition, but was released through the intervention of Ferdinand and Isabella.

In 1502 he undertook his fourth and last voyage, during which he sailed along the coast of Central America. An attempt to found a colony there ended in failure, and at Jamaica the ship proved unseaworthy. After waiting many weary months for help, the Admiral and his crew were taken to Spain in a vessel sent from Santo Domingo, Hayti. At home Columbus met with a disappointing reception, for the queen had died and the king had lost interest in him and his colonization plans. On May 20, 1506, he died at Valladolid, ignorant alike of the import of his discoveries, and of the fact that his name would be held in highest honor in the centuries to come. His body was interred in a monastery in Seville, but in 1542 it was removed, with that of his son Diego, to the cathedral at Santo Domingo. In 1796 the bodies were taken to Havana, but in 1898, when Cuba was lost to Spain, they were restored to their original resting places in Seville.

COLUMBUS, Ga., the county seat of Muscogee County, on the left bank of the Chattahochee River 100 miles south of Atlanta. It is on the Georgia Central, the Southern and the Georgia & Alabama railroads. The principal industries are eleven large cotton mills, cotton gins and iron works. There is a Federal building, a large hotel built by 300 citizens, a Carnegie Library and a city hospital. The export trade in cotton is extensive. Population, 1910, 20,554; in 1917, 26,306 (Federal estimate).

COLUMBUS, Ind., the county seat of Bartholomew County, forty-one miles east of Indianapolis, on the east fork of the White River, and on the Pennsylvania, and the Cleveland, Cincinnati, Chicago & St. Louis railroads. There is electric service to Indianapolis. It manufactures pulleys, tools, starch, flour, furniture, tanned leather and threshing and saw-mill machinery. The city has a $100,000 county hospital, a fine city hall and a Carnegie Library. Population, 1910, 8,813; in 1917, 9,310 (Federal estimate).

COLUMBUS, Miss., founded in 1817, is in Lowndes County, on the Tombigbee River and on the Southern and the Mobile & Ohio railroads. The industries include cotton mills, flouring mills, a large lumber company, an extensive greenhouse, brick plants and many small factories. Large quantities of coal are found in the vicinity. It is the seat of the Mississippi Industrial Institute and College, one of the largest girls' schools in the country, and two schools for colored people. Population in 1910, 8,988; in 1917, 10,815 (Federal estimate).

COLUMBUS, Ohio, founded in 1812 and since that time the capital of the state, is the third in size among Ohio cities and the county seat of Franklin County. The city is 132 miles southeast of Toledo, 170 miles southwest of Cleveland and 120 miles north-

east of Cincinnati. The unnavigable Scioto and Olentangy rivers run through the city. The first railroad to reach Columbus was the Columbus and Zenia, built in 1849; there are now nine trunk line roads and nearly twice as many branch lines and seven electric lines. The city is connected with the Ohio Canal, built to the Ohio River in 1832. There are seven large and six small parks, twelve general hospitals and several public libraries.

The state capitol is the civic center. From it High Street, the main business thoroughfare, runs north and south; it is intersected at Capitol Square by Broad Street, which is 120 feet wide and the location of fine churches, public buildings and residences. Other streets extend for the most part at right angles from these. Capitol Square, containing the capitol building, is faced by the city hall, the chamber of commerce, the Federal court building, the post office and the Y. M. C. A. buildings.

Educational interests are important. The Ohio State University (which see) is here, and there are also Capital University (Lutheran), Saint Joseph's Academy (Catholic), Saint Mary's of the Springs (Catholic), Columbus Art School and several private schools of high grade. A number of state institutions are located in Columbus; the most important of these are the central hospital for the insane and state schools for the blind and for the deaf and dumb.

There are in the city and suburbs over 700 manufacturing establishments, whose annual output of a vast variety of goods is valued at over $80,000,000. Columbus makes more piano stools and anvils than any other city in the United States. Population, 1910, 181,511; in 1917, 220,135 (Federal estimate).

COLUMN, *kol'um,* in architecture, a pillar, generally cylindrical in form, made of wood, stone, iron or other material and used to support a weight or to serve as an ornament. Strictly speaking, a column consists of a *base,* on which it rests; a *shaft,* cylindrical in form, and a *capital,* the portion surmounting the shaft. The Egyptians very early began to use columns extensively, as may be seen in the ruins of their temples. A great variety of designs and forms were employed, some columns being plain, smooth cylinders, elaborately decorated; others, square or polygonal in shape, and others, resembling a bundle of palms or lotus stems bound together. All were massive and heavy in appearance. The Persian columns were generally tall and slender.

The Greek Orders. The Greeks developed the forms of columns to their highest perfection, and their designs became conventionalized into the so-called *three orders of architecture,* in which the styles of the base, shaft and capital conform to certain fixed rules.

The *Doric* order (Fig. 1) is the oldest and simplest, and it is most frequently seen among the remains of ancient Greek architecture. It is distinguished by its want of a base and by its plain capital. The shaft is about five diameters high and is fluted, the flutes being few in number and joined together. The capital has two parts, of equal thickness, the upper a square block or plinth, called the *abacus,* resting upon a circular tablet, or *echinus.* The *entablature* is the portion above the capital and consists of three parts, the *architrave,* or portion directly above the column; the middle, or *frieze,* which is the only part decorated in the Doric order, and the cornice, or upper part. The best example of the Doric order of architecture is the Parthenon at Athens.

The *Ionic* order (Fig. 2) was invented by the Asiatic Greeks and was far more graceful and decorative than the Doric, though not elaborate. The Ionic column is light and slender, the shaft being about eight times its diameter in length. The capital is higher than the Doric, is ornamented and connected with the architrave by a thin ornamented abacus. The shaft is fluted and the twenty-four flutes are separated by narrow flat surfaces. The Erechtheum, on the Acropolis at Athens, is a good example of the Ionic style.

The *Corinthian* order (Fig. 3), though invented by the Greeks, hardly attained the dignity of an order till Roman times. It is really an Ionic column with a more elaborate capital, adorned with beautifully carved acanthus leaves. The Choragic Monument of Lysicrates at Athens contains fine examples of Corinthian columns.

The Roman Orders. The Romans borrowed their styles of columns from the Greeks and added the *Tuscan* and the *Composite* orders, besides perfecting the Corinthian base and entablature. The *Tuscan* was a development of the Doric, being perfectly plain, with an unchanged base and pedestal, and was invented by the Etruscans and other

early Italian races. The *Composite,* also called the *Roman* or *Italic* order, combined the Ionic and Corinthian orders and was especially pleasing to the Romans on account of its rich ornamentation. The use of the arch among the Romans compelled the building of heavy piers to support the structure, as slender columns would have been too fragile, and thus the column came to be used merely for decorative purposes. Columns were often embedded in the masonry between the arches or attached to the faces of the piers and ornamented with beautiful designs.

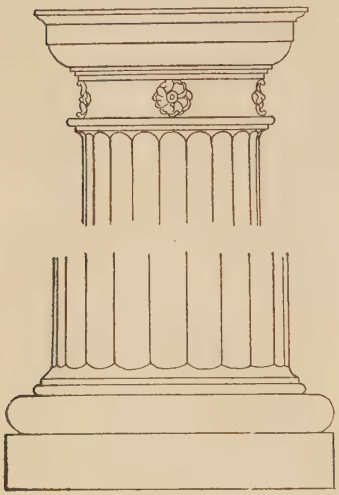


FIG. 1

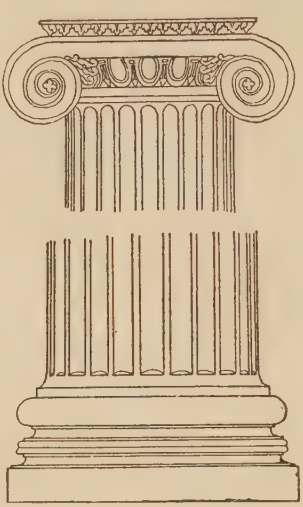


FIG. 2

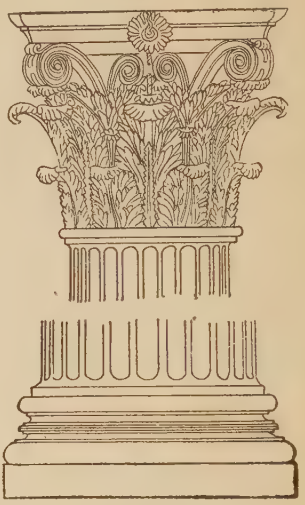


FIG. 3

Other Forms. Early Christian and medieval European architecture made free use of the column and introduced varied forms, especially in the shafts, which were often spiral, twisted or knotted, and were employed more often in groups or clusters than singly, chiefly as supports for arches. They were a feature of interior architecture, rather than exterior, as was the case with the Greeks. In modern architecture the column plays a subordinate part, both in decoration and usefulness.

Columns standing alone, unconnected with any building, have been erected at all times as monuments to commemorate important names and events, though they had at first only a religious significance. The Romans especially excelled in these monuments, the chief of which are the Column of Trajan and the Column of Antonine. See JULY, COLUMN OF; TRAJAN'S COLUMN.

COMANCHE, *ko man'che,* an Indian tribe, which formerly roamed through the region between Colorado and Mexico. The Comanche were excellent horsemen and extremely warlike, carrying on bitter warfare with the white people. About 1,000 of them are now on a reservation in Western Oklahoma.

COMBUSTION, or **BURNING,** in the ordinary sense of the word, is the union of some substance with oxygen, the union producing light and heat; for example, when wood or paper burns there is a bright flame and considerable heat. The term may be used, however, to mean the chemical union of any two substances, so as to give heat and light. The amount of heat given out by burning substances depends on their chemical composition and on the way the elements are combined. Heat may be produced rapidly, as when phosphorus is burned in the air and a flame results, or it may be formed slowly, as when phosphorus slowly combines with oxygen and is said to oxidize slowly. The amount of heat produced in each case is the same, and both are said to be in a state of combustion.

The products of combustion in most cases are gases and some solid matter. In early times it was thought that when a substance burned it was destroyed; but when chemists were able to collect the gases that came off from a burning body and analyzed them, it was found that such was not the case.

Nothing is destroyed. The form is merely changed.

Spontaneous combustion is accidental burning of a substance caused by the evolution of heat through chemical action within the elements comprising it.

COMEDY, *kom'e di,* a form of drama in which the subject matter is less serious and the treatment less dignified than in tragedy, and in which the outcome is happy. It is in general less exaggerated in its humor than the farce or the burlesque (see DRAMA). The following list includes some of the best-known comedies in modern literature:

Man and Superman.....Shaw
The Little Minister.....Barrie
The Mind-the-Paint Girl.....Pinero
She Stoops to Conquer (1773).....Goldsmith
The Rivals (1775).....Sheridan
The School for Scandal (1777).....Sheridan
Comedy of Errors (1594).....Shakespeare
Merchant of Venice (1597).....Shakespeare
Much Ado About Nothing (1597).Shakespeare
As You Like It (1599).....Shakespeare
Twelfth Night (1602).....Shakespeare
Rip Van Winkle (1866), Jefferson and Boucicault.

COMENIUS, *ko me'ni us,* JOHN AMOS (1592–1671), a Moravian clergyman, ranking as the greatest educator of his day. He began his career as a teacher in the school of the Bohemian Brethren in Moravia, and afterwards became a preacher and assumed charge of a school in his parish. After the Thirty Years' War he settled in Poland and assumed the direction of a gymnasium. It was while holding this position that Comenius published his first great work, *The Gate of Tongues Unlocked.*

Comenius can justly be considered the originator of methods and principles in general use at the present day. He divided schools into four classes: the mother school, which was the home; the vernacular school, or the primary school; the Latin school, and the university. He believed in the study of the mother tongue, the various branches of natural science and natural history. He also advocated the development of the child's moral and spiritual nature along with his intellectual powers, and he believed in physical training and equal education for both sexes.

COMETS, *kom'ets,* heavenly bodies which move with incredible speed from or toward the sun, in remarkable orbits. The appearance of a comet is always a matter of intense interest in the regions of the earth where it is visible, as few can be discerned by the naked eye. To the eye the comet appears to be composed of three parts: a star or bright spot, called the *nucleus;* a foggy mass surrounding this, called the *coma,* and the field of light, or *tail,* which follows the main comet. The tail is usually bright and narrow near the head, but it widens into a fan-shaped appendage farther from it. While the comet is approaching the sun, the tail trails behind, but as the comet goes away from the sun, the tail precedes it. The three parts are not always present, however, for sometimes a comet may seem like a thin cloud with a bright spot near the middle, or even like a small hairy mass.

Comets vary greatly in brilliancy, some being exceedingly bright, but only about thirty of such appear in a century. By means of the telescope new ones are continually being discovered. Some of these bodies travel around the sun in elliptical orbits; others appear from some unknown source, go toward the sun, pass around it and then depart on a line nearly parallel with the one on which they approached; while a third class, after going beyond the sun, leave it on a line which diverges from the one of their approach. It is evident that comets traveling in either of the last two orbits will never again approach the sun unless they are attracted from their respective courses.

No astronomer knows with certainty the exact composition of a comet or its origin; it is hard to tell what force has sent some of them from some other system, apparently, into this one of ours for a time; but the astronomers can predict the return of comets which have once appeared, if they are of the type that do return. It is supposed that the nucleus is composed of hard matter perhaps meteoric stones, and that the tail is gaseous, not necessarily itself in combustion, but perhaps bearing only reflected light of the sun. One comet at least has been known to divide into two and then to disappear, and it is thought that others are fading away. Of the comets that have been seen thus far, *Halley's comet,* which was discovered in 1682 and remained in sight for about a month, is the most important. Records show that it appeared in 1456, 1531 and 1607. It appeared again in 1759, 1835 and 1910. Upon observations of this comet

much of the modern theory is based. Other comets of importance are *Lexell's comet,* which was seen in 1770, but never reappeared; *Biela's comet* (1772, 1805, 1826, 1845), which later broke into two parts and then disappeared; and *Encke's comet* (1786). The last returns at irregular intervals of about three years. The most remarkable and brilliant of all was *Donati's comet,* which appeared in 1858. This will probably return in about the thirty-eighth century. In 1843 a very remarkable comet appeared, passing so near the sun that it probably went through the outer vapor of that body. In 1880 a similar comet appeared, apparently in the same orbit, and again in 1882, a third, to all appearances exactly similar to the two preceding. These are the first cases on record where several comets have been found in the same orbit, following one another in close succession.

COMIC OPERA, a form of operatic entertainment in which the subject matter is farcical and the music bright and melodious. The true comic opera, represented by the series produced by Gilbert and Sullivan, is a burlesque on the more serious form of opera. Among comic operas of genuine merit are *The Mikado, H. M. S. Pinafore* and *Pirates of Penzance,* by Gilbert and Sullivan; *Rob Roy* and *Robin Hood,* by Reginald De Koven; and *Babes in Toyland* and *Mlle. Modiste,* composed by Victor Herbert.

A modern and very popular variant of the real comic opera is the so-called musical comedy, in which a feeble story serves as a basis upon which to build a spectacular entertainment of music and buffoonery. Expensive costumes, gorgeous scenery and "catchy" music are considered essential to the success of these entertainments. Occasionally a musical comedy of superior merit is produced, such as *The Merry Widow, The Chocolate Soldier* and *Sari.* The distinction between a high-class musical comedy and comic opera is, however, not always easy to make. The French term *opéra comique* is applied to a dramatic composition which it set to music, but contains spoken dialogue and is often of a serious character. To this class belong Beethoven's *Fidelio* and Weber's *Der Freischütz.*

COMITIA, *ko mish'i ah,* the name given in ancient Rome to the meetings of the people in which state questions were voted upon. The *Comitia Curiata* was the oldest of the comitiae and was made up of patricians only. For centuries, until the time when the plebeians grew strong in their demands for equal rights, the *Comitia Curiata* had the highest power in the state. Its importance grew less, however, as the *Comitia Centuriata* became more prominent. This second assembly admitted the entire free population of Rome, and the vote was taken by units containing one hundred or more persons, and called centuries. The third assembly, the *Comitia Tributa,* was an assembly of the tribes and was probably made up entirely of plebeians.

COMMAND'ER, a naval officer whose rank is below that of captain and corresponding to that of lieutenant-colonel in the army. The salary of a commander is $3,500 to $4,500 per year, according to length of service. This officer is placed in command of war vessels of small tonnage, but usually not of cruiser rank. See NAVY.

COMMENCEMENT, *kom mens'ment,* in colleges and universities of the United States, the day upon which degrees are conferred upon graduating students, upon candidates for postgraduate degrees, and upon recipients of honorary degrees. The term is commonly used to designate the exercises marking the close of secondary and elementary schools, but this use of the term is not strictly justified.

COMMERCE, *kom'murs,* the exchange of products, and specially, an exchange transacted between people remote from each other. The desire to secure trade in neighboring countries and indeed in distant lands beyond the seas has developed bitter rivalries among the nations and has been the most important cause of many of the world's great wars.

The first means of commerce was barter, the different producers meeting in person and exchanging their goods. With development of civilization and industry, exchanges became so common and complex that some men devoted themselves entirely to conducting exchanges. Thus arose the class known as merchants. During the Middle Ages these merchants began to congregate at certain times and places for the more economical exchange of their wares; so markets and fairs came into vogue. Eventually, these market places grew in importance and size until whole towns were given over to this trade and were licensed by the king. With the

decline of feudalism, however, and the gradual growth in the independence of individuals, commerce became more general and the old market towns lost their prestige, though fairs and markets are still held in some important cities of Europe. Commerce between Europe and Asia was stimulated by the Crusades, but not until the sixteenth century. did trade between nations begin to assume its present world-wide importance.

COMMERCE, CHAMBER OF. See CHAMBER OF COMMERCE.

COMMERCE, CHAMBER OF, OF THE UNITED STATES. See CHAMBER OF COMMERCE OF THE UNITED STATES.

COMMERCE, DEPARTMENT OF, one of the executive departments of the United States government, in charge of the Secretary of Commerce, who by virtue of his office is a member of the President's Cabinet (see CABINET). The department was organized, with that of Labor, in 1903 as the Department of Commerce and Labor, but in 1913 the two were separated (see LABOR, DEPARTMENT OF).

The Department of Commerce embraces a number of bureaus that formerly belonged to other departments, such as the Lighthouse Board, the Lighthouse Establishment, the Steamboat Inspection Service, the Coast and Geodetic Survey, the Bureau of Statistics, the Bureau of Navigation the Census Bureau, the Bureau of Foreign Commerce, the Bureau of Standards, and the Fish Commission. It also includes two new bureaus, those of Corporations and Manufactures. The duties of the former bureau are to deal with corporations, other than railroads, engaged in commerce with foreign nations and between states. The commissioner has the same authority to investigate such corporations as is given the Interstate Commerce Commission over railroads.

COMMERCIAL AGENCY, an organization which secures information regarding business houses, for the benefit of other business concerns from whom credit is solicited. The facts ascertained, from intimate investigation, relate to the amount of capital invested, other financial responsibility, promptness with which debts are paid, the moral factor, etc. With such a report before him a credit man may easily determine whether the seeker for credit is a safe risk, and to what amount. The leading commercial agencies are R. G. Dun & Company and Bradstreet's. See A 1 AND Aa1.

COMMERCIAL LAW, the law which regulates commercial affairs. It is derived from the maritime codes of medieval Europe, the imperial code of Rome, international law and the customs of merchants. In the United States the term includes chiefly the law dealing with contracts of every nature. The principal subjects embraced within it are the laws of shipping, negotiable paper, sales, common carriers, partnerships, and the like.

COMMISSION FORM OF GOVERNMENT, a system of city government, in its inception known as the *Galveston Plan,* because it was introduced into Galveston, Texas, in 1901, following a disastrous flood and resultant disorder in that city. In its simplest form the commission system of city government places the entire administration of the city's business in the hands of a few men, usually five, who are elected by the legal voters. The chairman or president of the commission is the mayor, and each commissioner has charge of some branch of the city's business, for the administration of which he is directly responsible to the people. The commission is the source of all authority in city affairs, makes all the ordinances, appoints all the officers, collects taxes and makes appropriations.

The commission system is characterized by the following features:

1. The assignment of the important divisions of the city government to individual members of the commission, each of whom is directly responsible to the people.
2. Adequate compensation to members of the commission, thus enabling them to devote their entire time to the affairs of the city.
3. Selection of all employees above day laborers on examination, oral and written, and given for the purpose of determining fitness.
4. Provision for retention in office of all employees so appointed, during good behavior.
5. Power of initiation and referendum reserved by the people. See Referendum.
6. Power of recall reserved by the people.

In some cities the terms of all commissioners expire the same year, in others, only one retires each year. This system of municipal government is growing in favor; in 1919 over 600 cities were governed under the commission plan, the largest being Buffalo, Newark, N. J., New Orleans, Jersey City and Denver. See CITY MANAGER.

COMMITTEES OF CORRESPONDENCE, patriot committees organized in the American colonies before the outbreak of the

Revolution. They were in effect publicity, or propaganda, committees, being charged with the duty of collecting and publishing the grievances of the Americans and of maintaining correspondence between the different colonies. In addition, they secured authentic information regarding Parliamentary acts in England. The organization of these committees, the first of which was formed in 1772, was an important step in the process of uniting the colonies.

COMMODORE, *kahm'o dohr*, formerly the title of a naval officer of the United States, in rank between captain, below, and rear-admiral, above. The comparative rank in the army was that of brigadier-general. The grade of commodore was abolished in 1899; the men holding that rank were advanced to the next higher grade. The salary was $5,000 per year.

COMMON CARRIER, an individual or corporation which transports goods and passengers for hire. Two rules of law govern the regulation of carriers: (1) they must carry any who apply to them, without discrimination; (2) they are responsible, in the case of transportation of freight, for the loss or injury of the goods entrusted to them, even without negligence on their part. This responsibility extends to all cases except those arising (a) through "act of God," that is, accidents in which there is no human agency; (b) through act of a public enemy, that is, a government at war, or pirates; (c) through the act or default of the shipper; (d) through acts of public authorities; (e) from the nature of the goods transported; (f) from the ordinary wear and loss, such as perishable goods. The liability of the carrier begins when the goods have been placed in the hands of its agents, and its liability ends when they have been transported to the place agreed upon. This may be, in the case of a railroad, in its freight house at the point of destination; in the case of express companies, at the business or residence address of the consignee.

In relation to *passengers*, the carrier is bound to carry those whom it accepts, without negligence. In the case of accidents it rests with the carrier to show that the accident arose from no fault of its own or on the part of its servants or agents. Hence, injured passengers or, in case of death, their nearest relatives, have a claim for compensation, provided they did not contribute to the injury by negligence. The same rules apply in general to carriers by water, together with certain special regulations applicable to these carriers alone. In case of danger from tempest or from enemies, ship passengers may be called upon by the captain or commander to lend their assistance for the general safety.

COMMON COUNCIL, the legislative body of a city or incorporated town. In the former it is usually given the name *board of aldermen* (see ALDERMAN). The common council sometimes consists of two houses or chambers, but usually is a single body. In American cities the council is elected by the people; the members usually serve two years.

COMMON LAW, the unwritten law, the law that receives its binding force from immemorial usage and universal reception. It consists of that body of rules, principles and customs which has been received from former times, and by which courts have been guided in their judicial decisions. It is contrasted with *statute* law, which is contained in acts of a legislature. Wherever statute law runs counter to common law the latter is entirely overruled. In the United States there is no national common law, but the state courts have relied on the English common law and have developed a fairly uniform system of common law throughout the country.

Related Articles. Consult the following titles for additional information:
Civil Law
Equity
Law
Statute

COM'MONS, HOUSE OF. See GREAT BRITAIN, subhead *Government*.

COMMON SCHOOLS. This term as generally understood refers to schools that are supported by the state and that give instruction in the elementary branches. In every advanced country the common school is recognized as the foundation stone of the nation's progress. A universal common-school system is the only system which insures an education for the masses, and upon the general intelligence of the citizen body depend the stability and prosperity of the nation.

Common schools date from the Middle Ages, particularly from the Reformation

period. Luther not only favored public schools, but his doctrine made them a necessity to his followers. He held that individuals were responsible for their beliefs, and that these beliefs were to be based on the personal study of the Bible; hence, it was necessary for every one to learn to read. Previous to Luther's time, Latin had been generally taught in the schools, and little or no attention had been given to the teaching of the mother tongue. Now children were taught to read and write their own language. The invention of printing, which occured a few years before, made it possible to supply the people with books and thus aided in the work of general education throughout Europe. The status of the common schools in each of the European countries is treated in the respective articles, under the subhead EDUCATION.

In America. The American colonists gave early attention to education. Schools were established in Boston as early as 1635, and in 1637 the General Court of Massachussetts decreed that every town having fifty families should establish a common school for the instruction of the children who desired to attend. The expenses of such schools were to be met either by the town as a whole or by the families whose children attended. The same act provided for the establishment of a grammar school, which should fit boys for college, in every town of 100 or more families. Connecticut and New Haven followed within the next few years, but no system of public schools was established in Rhode Island until 1790. Among the Middle Colonies, the Dutch in New York organized a system of public schools before that colony was taken by the English. After this event little attention was paid to public education until after the Revolution. The Swedes in New Jersey and Delaware also founded schools, and the charter granted William Penn provided for a system of public education. This, however, was not carried out until long after Penn's death. In 1698 the Society of Friends established a school in Philadelphia, which is now known as the Penn Charter School, but it was not until after the middle of the eighteenth century that measures were taken for systematic instruction of the children by the colony.

The Southern colonies, having an entirely different social system, did not establish public schools. The large plantations and the consequently sparse settlement of the country made such institutions practically impossible during the early history of these colonies. The children of planters were taught in their homes, either by tutors or governesses, and the boys of some wealthy families were sent to England to complete their education. The growth of slavery, following the Revolutionary War, perpetuated the early institutions of the South, so that few free public schools were established in the slave-holding states until their reorganization after the Civil War.

The resources of the country were so thoroughly taxed during the Revolutionary War that but little attention could be given to education; consequently there was no progress in the common schools during that period. After the close of the war the New England states gave attention to their schools. With the exception of Massachusetts, in New England and all other parts of the country, free public schools were considered charitable institutions, maintained for the education of the children of those families who were too poor to pay for the instruction; and wherever possible rate bills or local taxes were assessed on all families sending children to these schools. This plan made the schools odious to those for whom they were established, and contemptible to others; consequently it did not succeed.

The establishment of public schools at state expense was undoubtedly delayed because of the lack of funds, and the condition of the country was such during the years immediately following the Revolution that increased taxation for any purpose was impossible. In 1805 the Public School Society of New York was formed. The purpose was to maintain schools for the instruction of those children whose parents were unable to provide it themselves, but the plan was soon broadened to include all children who applied, and from this the ascent to the support of common schools by the state was comparatively easy. Soon after this New York provided for county supervision of schools. Pennsylvania was somewhat behind New York, but the New England states were in the van of the movement. As the states west of the Alleghanies were organized, school systems, modeled after the plan of the states from which the settlers had come, were instituted.

The common schools of the United States

are now, with few exceptions, thoroughly organized and economically managed. All cities, large towns and villages have graded schools, and in many states graded courses of study are provided for the rural schools. Immense sums have been spent upon buildings, grounds and appliances in cities and towns and in the wealthier rural communities. While each state is a law unto itself, as far as its determination of courses of study, qualifications of teachers, methods of organization and management are concerned, yet in their main features all of the state systems are essentially the same. Though there is not, technically or legally, a national system of education, the uniformity of these state systems practically makes the whole system national.

Consult, in each of the state articles, the subhead Education. See, also High School, subhead Junior High School.

COMMONWEALTH OF ENGLAND, the name usually given to the form of government which was in force from the death of Charles I, 1649, to the restoration of Charles II, in 1660. That is, it was the period during which England was governed without a king. The interval in which Cromwell governed as Lord Protector, from 1653 to his death, is known as the Protectorate. See CROMWELL, OLIVER.

COMMUNE, *kom mune'*, the smallest government district in France and in some other countries, as Belgium. A commune sometimes embraces a number of villages, while some large cities are divided into a number of communes. In either case each commune is governed by an officer called a mayor, who is assisted by a deliberative assembly called the *conseil municipal.* In America the township is the local unit most like the commune.

COMMUNE OF PARIS, a name applied in French history to two bodies which at different times ruled Paris. The first was a revolutionary committee which in 1792 took the place of the municipal government of Paris and soon usurped the supreme authority in the country. Among its chiefs were some of the most violent of the demagogues, such as Hébert, Danton and Robespierre (see FRENCH REVOLUTION).

The name was also adopted by the ultra-radical party brought in to prominence by the events of the Franco-German War, and, more immediately, by the siege of Paris (October, 1870, to January, 1871). This party ruled Paris for a brief period after the evacuation of the German troops and had to be suppressed by troops collected by the National Assembly of France. During this régime much valuable property was destroyed.

COMMUNISM, *kom'u niz'm*, an economic system based on the theory that the individual has no right to own property, and that the wants of a community should be supplied from a common fund. No communistic society has as yet been completely successful, though many have been organized and some still exist. The most famous of these in the United States were those of Brook Farm, Mass. (see BROOK FARM), and New Harmony, Ind., the latter established by an Englishman, Robert Owen. Of those still in existence, the Shakers (which see), the Oneida Community, in New York, and the Amana Community (see AMANA SOCIETY), near Davenport, Iowa, are of the most importance. Communism differs from simple socialism, in including the socialization of *products,* as well as of the *means of production,* though some socialists do demand complete communism.

COMMUNITY CENTER. The spirit of friendly coöperation in local communities is one of the most encouraging aspects of modern life. It is being particularly manifested in the establishment of neighborhood centers, where all the people of the community meet on a common footing for recreation, fellowship or educational uplift. Most important of the agencies used for neighborhood coöperation is the school. In rural districts the idea of using the local schoolhouse as a social center is not new, but until recent years city schools were usually closed evenings, unless open for night classes, and the practice of using them as neighborhood meeting places was unknown. Prof. Edward J. Ward, a specialist in community organization, who became connected with the United States Bureau of Education, has been chiefly instrumental in furthering the idea of making the school a center of community interests.

The plan recommended by Professor Ward is about as follows: There should first of all be a preliminary organization of the adult citizens of a neighborhood. They may apply to the proper authorities for the use of the school building in the organization of a neighborhood forum, conducted on the same plan as a debating or literary society.

The neighborhood forum gives opportunity for the presentation and discussion of questions pertaining to the community, and provides a basis for a broader organization of the community center. The ideal sought is the establishment of a center where neighborhood athletic, dramatic, social and educational clubs may meet, where young people may gather for recreation, where questions of civic welfare may be discussed, and people of all ages may meet for holiday celebrations and reunions.

To further the efforts of community workers the Hollis-Johnson Community Forum Bill was drafted and introduced into Congress. It provides for a completed community center along the following lines:

That whenever a public school building shall have been established as a community forum under the provisions of this act, and upon request to the board of education so to do by a majority of the adult persons present and qualified to vote at any regular meeting, the said board shall designate such building as a community center for the organized training and recreation of the young people of the community, including such activities as may be requested by the said adult organization and approved by the said board, and shall make all necessary and appropriate arrangements for the convenient and proper use of the building for community center meetings and activities, at such times as the said adult organization may request and the said board approve.

It shall be the duty of the board of education to provide out of appropriations of public funds authorized for the public schools, light, heat, janitor service and such other expenses as may be necessary to enable the comfortable and convenient use of public school buildings as community forums and community centers under the provisions of this act.

COMO, a lake in the north of Italy, at the foot of the Alps, fed and drained by the river Adda. It is celebrated for the beautiful scenery of its shores, which are covered with handsome villas, gardens and vineyards, behind which mountains rise to the height of 7,000 feet. Trout and other fish abound in the lake. The chief towns on its shores are Como, Bellano, Bellaggio and Menaggio.

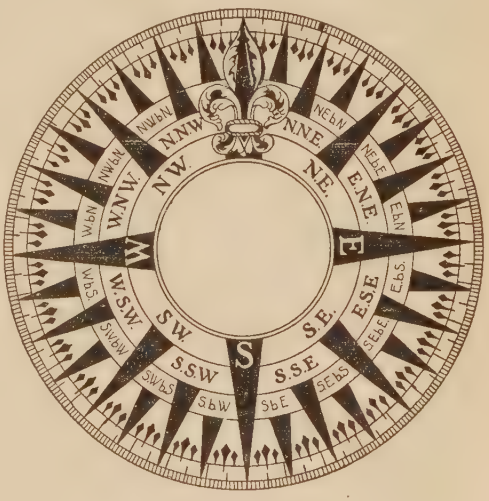
COMO, *ko'mo*, ITALY, capital of the province of Como, in the northern part of the country, in a delightful valley at the southwest extremity of Lake Como. The city is twenty-four miles northwest of Milan. It has a splendid marble cathedral, dating from the fourteenth century. The manufactures include woolens, silks and cotton. Here were born Pliny, the Elder and the Younger, and Volta, the physicist. Population, 1911, 43,439.

COMORO, *kahm'o ro*, **ISLANDS**, since 1914 a colony of France, in the Indian Ocean, attached to the government of Madagascar. There are four islands, with an area of 800 square miles and a population of 98,000. The entire group was ceded to France in 1886, but the largest island, Mayotta, has been a French possession since 1842.

COMPANY, in commerce. See PARTNERSHIP; CORPORATION; TRADING COMPANIES.

COMPASS, *kum'pas*, an instrument for determining direction with reference to the north and south points. The earth is a gigantic magnet, with its poles near the geographical north and south poles; and the attraction of these magnetic poles is sufficient to keep the needle pointing north and south. (See MAGNETISM.) Compasses are usually classified as the surveyor's compass, the mariner's compass and the variation compass.

The *surveyor's compass* consists of a magnetic needle enclosed in a circular box and



THE MARINER'S COMPASS

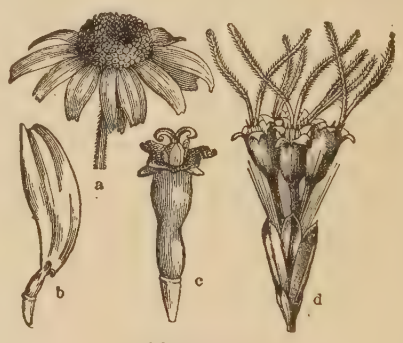
moving over a disk graduated to degrees, minutes and seconds. The frame has two vertical sights at opposite ends of a diameter, so as to secure accurate pointing. The direction of the line in which the compass points is determined by reading the number of degrees between the north pole of the needle and the line of sight. A level and a tripod are necessary parts of a surveyor's compass.

The *mariner's compass* is used on board ship; it consists of several magnetic needles arranged parallel to one another and attached to a card, which is mounted at its center upon the end of an upright steel pivot. The whole arrangement is enclosed in a circular brass box, which is hung within a wooden box and is so fixed that the compass card remains horizontal, whatever position the ship may take. The card is divided into thirty-two equal parts by lines drawn from the center to the circumference. The intervals between these points are divided into halves and quarters, so that the entire circumference is divided into 360 equal parts or degrees. Four principal points, north, south, east and west, are designated as *cardinal points*. The names of the others are compounds of these. The direction of the ship is determined by noting the number of degrees between the north pole of the needle and the course as indicated by a line from the center of the wheel to the point of the bow. Since the needle is subject to variation on account of the magnetism of the earth and also because of the influences of the ship itself, nearly all vessels carry several compasses, which are read and carefully compared several times each day. The variation is greater on steel vessels than on those constructed of wood. Navigators' tables, indicating the variation of the compass in various parts of the ocean, are in general use, and by these the navigator is able to correct his compass without difficulty.

COMPASSES, or **DIVIDERS**, a mathematical instrument, used for describing circles and measuring lines. The compasses consist simply of two pointed legs, movable on a joint or pivot, and they are used for measuring and transferring distances. For describing circles the lower end of one of the legs is removed and its place is supplied by a holder for a pencil or pen. *Hair compasses* are compasses having a spring, tending to keep the legs apart, and a finely threaded screw, by which the spring can be compressed or relaxed with the utmost nicety and the distance of the legs regulated to a hair's breadth.

COMPASS PLANT, an annual plant belonging to the composite family, common in the prairies of the Western states. The large, ragged leaves grow upright on rather long stems. As the structure of these leaves is the same on both sides, both surfaces are equally sensitive to the light, and they are able to secure an equal amount of light for both sides of the leaves only by having their edges vertical and their tips to the north and the south. Hence the name of the plant. *Resin weed* is another name for this plant, derived from the fact that the stems contain resinous matter.

COMPOSITE, *kom poz'it*, **FAMILY**, or **COMPOSITAE**, *kom poz'i tee*, the largest family of plants, containing over 12,000 known species, which are grouped in 1,000 genera. They consist of herbs or shrubs and are distributed all over the world. The characteristic of the family is the head of small flowers, which in itself is sometimes mistaken for one large flower. The resemblance is made stronger by the fact that in many species the flowers in the outer margin of the head are different in form from the others,



COMPOSITAE
a, Flower head; b, Single ray flower; c, Single disc flower; d, Small head with tubular flowers only.

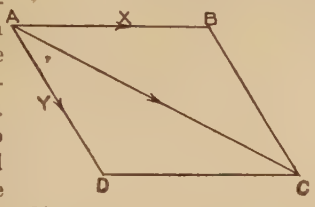
and their tubular corollas are modified so as to resemble the petals of a simpler flower. The small flowers in the middle of the head, which resemble the pistils and stamens of a typical flower, are intermingled with bristles and scales of various forms, which, with the appendages to the seeds, are important factors in classifying the plants of this difficult group. While a typical flower is on the plan of five and is perfect, yet the outer flowers are irregular and not infrequently imperfect and sterile.

When it is remembered that nearly one-tenth of the known species of flowering plants belong to this one family, its importance may be understood. A great many of the plants are cultivated for ornament, and some few serve as food plants. Others have considerable medicinal value. A great many different plants of this order are described under appropriate titles in this work.

Related Articles. Among the plants of this family reference to the following will prove helpful:

Arnica	Daisy
Aster	Goldenrod
Chrysanthemum	Lettuce
Dahlia	Thistle

COMPOSITION OF FORCES, in physics, is the union of several forces that are acting in different directions, into an equivalent force acting in another direction. Thus, two forces, as *X* and *Y*, acting in the directions of the adjacent sides of the figure *ABCD*, unite to form a force acting in the direction of the diagonal *AC*. If the lengths of the adjacent sides of the parallelogram represent the relative magnitudes of the forces, the diagonal will represent the magnitude of the compounding force. The length of the diagonal, or equivalent force is called the *resultant*.



COMPRESSED AIR, air confined under pressure greater than the pressure of the atmosphere, which is about 14.7 pounds to the square inch at sea level. The simplest example of air compressed and made to perform work is found in the boy's popgun, whose barrel is made from an elder stalk from which the central pith has been extracted. Applying the same principle to mechanics in a great variety of ways, men have put air to work to operate large hammers, rock drills and other pneumatic tools, air hoists, canal locks and some classes of elevators; to lift water, acids, and other liquids; as a treatment for tuberculosis, by expanding the lungs; to paint broad surfaces, such as bridges, freight cars, warehouses and buildings; to force plastic material through dies, holes and pipes; to operate mine cars and brakes on railroad cars; to inflate pneumatic tires for automobiles, bicycles and carriages; to drive the sand in a sand blast; to clean carpets, rugs, cars, and for hundreds of other purposes.

As a means of transmitting power compressed or condensed air received the attention of scientists as early as A. D. 1700. See AIR BRAKE; PNEUMATIC TOOLS.

COMPROMISE, *kom'pro mize,* **OF 1850,** a set of compromise measures passed in August, 1850, in the Congress of the United States, their purpose being to allay the strife over slavery by granting concessions to both parties. Under the compromise, Texas was allowed $10,000,000 for renouncing its claims to New Mexico; California was admitted to the Union as a free state; New Mexico and Utah were organized as territories, with the right to adopt or reject slavery; the slave trade was abolished in the District of Columbia; fugitive negroes were denied a trial by jury, but were to be returned to their owners upon certain affidavits. This latter provision was known as the Fugitive Slave Law (which see). The compromise was passed largely through the efforts of Daniel Webster, Henry Clay and John C. Calhoun, each of whom made his last great speech in its behalf.

COMPTROLLER, *kon trohl'er,* a public officer, usually appointed and not elected, is a person whose duty is to audit and certify public accounts. His tasks are similar to those of an auditor, but he has more extended powers, including executive functions.

In the United States government the *Comptroller of the Treasury* must sign all warrants for the payment of money out of the Treasury, and he therefore controls absolutely all the vast expenditures of the Federal government. Any proposed payment he deems not in strict conformity with Congressional appropriations he may refuse to sanction, and there is no appeal from his decision except to Congress.

COMPULSORY EDUCATION. The right of the state to educate the child for citizenship has been recognized from ancient times. The best example of compulsory education among the early nations is the system adopted by the Spartans. Their education of boys was primarily military and had for its purpose the making of soldiers. But from compulsory training in military affairs to compulsory training in other lines was an easy step, and Athens extended its training to include other subjects than those dealing with war.

As the term is now applied, compulsory education means compelling the attendance of children of school age, usually between six and fourteen or six and sixteen years of age, upon the elementary schools, public or private, for a specified number of months each year. Laws compelling such attendance are in force in all progressive countries throughout the world. In the United States compulsory attendance measures are almost

as old as the public school system, but state laws for the purpose did not receive general attention until the latter half of the nineteenth century. Most of the states now have stringent laws requiring parents to send children to school and providing for fines, and in some cases for imprisonment, as penalties for failure to comply with the law. Children who have acquired a knowledge of the branches taught in the common schools, defectives and those in ill health are exempt. Compulsory education laws are necessary because of the increasing tendency to employ children in mines, factories and large stores. In the large cities these laws are quite rigidly enforced, but in the rural districts and in most of the smaller towns the authorities are sometimes indifferent.

The laws are enforced by truant officers, who are appointed by the local board of education. These officers have authority to arrest any child to whom the law applies and commit him to school in his district. If, after warning, the parents do not keep their children in school, the truant officer has authority to have such parents arrested and brought before the local court for trial. In large cities truant schools, in which habitually truant pupils can be confined, are established.

COMTE, *koNt,* Isidore Auguste Marie François Xavier (1798–1857), the founder of the positive system of philosophy, or Positivism, was born at Montpellier, France. When sixteen, he entered the polytechnical school at Paris, from which he was expelled two years later. After this he became interested in the socialistic teachings of Saint Simon, from which the doctrines of his own system originated. In 1826 he undertook a series of lectures, but was unable to complete the work, because of temporary mental derangement. After recovery he began systematic work upon the exposition of his doctrines, which he gave in his *Course of Positive Philosophy,* a work consisting of six volumes and requiring twelve years for its preparation. He was for a few years professor of mathematics in the polytechnic school, but was dismissed, and during the remainder of his life he was supported chiefly by his friends.

The underlying principle of Comte's philosophy is known as "the law of three stages." According to this law, intelligence, whether of the individual or of society, has passed through three stages or periods of development: the *theological* stage, in which supernatural beings are believed to produce all phenomena; the *metaphysical* stage, in which abstractions, such as mental or physical force, are regarded as the causes of all activity, and finally, the *positive* stage, in which the search for ultimate causes is given up, and effort is confined to discovering the actual relations or associations that observation shows to exist among phenomena.

CONCEPCION, *kon sep se own',* Chile, a seaport of South America, capital of a province of the same name, situated six miles from the mouth of the Biobio River and 270 miles southwest of Santiago. The chief buildings are a cathedral, an agricultural school, a normal school and a town hall. Its port is Talcahuano, about eight miles distant. Concepcion was founded in 1550 by Valdivia and has been several times nearly destroyed by earthquakes. Population, 1917, 68,902.

CONCEPT, *kon'sept,* in psychology, the name generally given to the idea of a class, or general, notion. The first step in the formation of concepts is the acquisition of individual ideas through the senses. As these ideas are acquired, they are compared and their points of similarity and dissimilarity are noted. The qualities given to the ideas are separated from the others and grouped together, forming an idea which applies to all the objects of the class. This idea is a concept. One's idea of *orange, apple, horse,* applies to all oranges, all apples or all horses, as far as his knowledge of each of these classes of objects extends, and it is not an idea of any particular orange, apple or horse. A concept is an abstract idea consisting of a group of qualities common to all objects to which it can be applied. In this respect it is different from an image. An image is a mental picture of an individual object, which includes all of that object's peculiarities. One's concept of man, if accurate, will apply to all men; but the mental image of one's father includes all of those peculiarities pertaining to the father's personal appearance, such as height, weight, facial expression, color of hair and eyes.

The formation of concepts is the first step in thinking. It begins early in life and is at first spontaneous. The earliest concepts are very crude, and they need to be perfected through voluntary observation. Parents and teachers can materially assist children in the

formation of concepts, by observing the following principles:

(1) There is a vital connection between sensation, perception and the formation of concepts. The child's success in forming class ideas depends upon the care with which he has acquired individual ideas.

(2) The child should be trained to form clear and correct concepts early in life, since the time soon comes when ideas of individual objects obtained through perception will not be sufficient for his needs, and he will have to draw upon the idea earlier acquired as a basis of comparison, in order that he may correctly classify his knowledge. If his early concepts are correct, his classification will be much more accurate than if these concepts are false.

(3) Concrete illustrations are necessary to enable children to form correct concepts, and these should be chosen with care. They should bring before the child the idea which he should obtain and should be clear and pointed.

(4) One should always be able to change his concepts into images of the individuals for which the concept stands. In other words, one should be able to apply his general notions to individual cases. If he is not able to do this, his concepts are not clear. Much of the difficulty which pupils experience in arithmetic, grammar and other branches arises from their inability to image their concepts, or, in other words, to apply the principles and rules which they have learned to the solution of problems presented to them. This difficulty can usually be avoided if concepts are formed through observation.

Related Articles. Consult the following titles for additional information:

Abstraction	Methods of Teaching
Inductive Method	Perception
Judgment	Thought

CONCERTINA, *kon sur te'nah,* a musical instrument, an improved form of the accordion (which see). It is composed of a bellows, with two faces or ends, generally polygonal in shape, on which are placed the various stops, or studs. By the action of these, when they are manipulated by the performer's fingers, air is admitted to metallic reeds, which produce the sounds.

CONCH, *konk,* a tropical mollusk having a heavy spiral shell. In the East Indies the shell of one species is perforated at the tip, fitted with a mouth-piece and used as a musical instrument. In the United States and Europe conch shells are ground for use in porcelain manufacture. Cameos are sometimes cut from these shells, and buttons also are made from them. The egg cases of the conch are known as "sea necklaces," as they resemble leathery disks strung on a cord.

CONCH

CONCLAVE, the assembly of the Roman Catholic cardinals for the election of a Pope. A two-thirds vote is necessary for an election. The cardinals meet in a part of the Vatican which has been divided into several small apartments. After the first day they are locked in and are allowed no communication with the outer world till after the election takes place. Even the food, passed through a window, is thoroughly examined that no letters or notes may reach the members of the Sacred College. See Sacred College; Pope.

CONCORD, Battle of. See Lexington, Battle of.

CONCORD, Mass., a town of Middlesex County, occupying an important place in American historical and literary annals. Here, at Concord Bridge, April 19, 1775, the first shots of the American Revolution were fired, and a monument on the bank of the river marks where two English soldiers fell. It is also famous as the home of Ralph Waldo Emerson, Hawthorne, Thoreau and Louisa M. Alcott; Orchard House, the home of the authoress, is an interesting landmark. Another point of interest is beautiful Sleepy Hollow Cemetery, where Thoreau, Emerson and Hawthorne are buried. Concord is twenty miles northwest of Boston, on the Concord and Sudbury rivers. Population, 1910, 6,421.

CONCORD, N. H., the capital of the state, its third city in size, and the county seat of Merrimac County, seventy-five miles northwest of Boston, on the Merrimac River and on the Boston & Maine Railroad. The noteworthy buildings include the statehouse, the Federal building, the courthouse, the state insane asylum and the state library. Saint Paul's School for boys and Saint Mary's School for girls are located here. The quarrying of granite in the vicinity is the leading industry. Concord was founded in 1725 as Pennacook, and it was incorporated as Rumford eight years later, but was renamed Concord in 1765 and incorporated as a city in 1853. The town suffered greatly from an Indian massacre in 1746. Population, 1910, 21,497; in 1917, 22,858 (Federal estimate).

CONCOR'DANCE, an index in which all the important words of any work are ar-

ranged alphabetically, with references to show where each word occurs. This sort of concordance is called a *verbal* concordance while a similar work in which subjects are indexed is known as a *real* concordance. By far the greatest number of concordances treat of the Bible. The best concordances of the English Bible are Cruden's, Robert Young's and James Strong's. Concordances have been made for Shakespeare, Tennyson, Milton, Pope, Dickens and others.

CONCORDAT, *kon kawr'dat*, a term applied to a formal agreement entered into by the Pope and a secular government pertaining to Roman Catholic affairs within the country involved. Sometimes it takes the form of a Papal bull, and sometimes that of a formal treaty. During the period of Papal supremacy in temporal affairs concodats were of much greater importance than now.

CONCRETE, *kon kreet'*, a composition which may be described as artificial stone, used in rapidly increasing quantities for a wide range of building purposes. Its most common use for years was for road building, for it makes a hard, smooth and durable highway. When covered with a coating of asphalt a road is made as smooth as a floor. Within recent years the uses of concrete have been so extended that the present has been called the beginning of the "Concrete Age." To-day great business blocks are constructed of concrete, reinforced by steel frames; mammoth factories, fine residences, beautiful bridges and handsome viaducts are built with it, and in 1918 concrete was found to be a proved material for the construction of cargo ships by both the United States and England.

Concrete is made by mixing cement, sand and gravel or crushed stone in the proportions of one part, two parts and four parts, respectively; sufficient water is used to wet each particle of material used. Such a mixture is known as *reinforced concrete*. Another combination frequently employed, though not considered as desirable, is one part cement, three parts sand and six parts gravel or crushed stone, with the necessary water; this combination meets all requirements for most uses.

A plastic mass such as results from the mixing of these ingredients may be pressed into any desired form and admits of architectural designs which are particularly pleasing. The concrete, for all building purposes, is poured into molds and firmly pressed; when it hardens the molds are removed. Concrete for small structures is often mixed by hand by the use of shovels, but when large quantities are needed mixing machines, run by steam or electricity, are employed.

For about three cubic yards of concrete there are required one cubic yard of sand, two cubic yards of gravel or crushed stone and 1,000 pounds of cement.

CONDENSA'TION, in natural science, the passing of a vapor or a gas into the form of a liquid. The formation of raindrops is an example of condensation, the necessary conditions being the presence of vapor in the air and a fall of temperature. When the temperature reaches a certain point the vapor condenses into the water and rain falls. Other examples of condensation are the formation of dew (which see) and the "sweating" of pitchers of ice water. See HEAT; RAIN.

CONDENSED MILK. See MILK, CONDENSED.

CON'DOR, a huge bird of the South American Andes, belonging to the vulture family and noted for its powers of flight, strength and keenness of sight. It attains a length

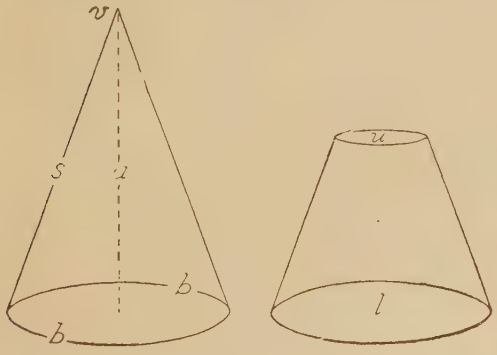
CONDOR

of fifty-five inches, and its wing expanse is from eight and one-half to ten feet or more. The condor is for the most part black, with white wing markings. There is a ruff of

soft white feathers around the lower part of the neck, the skin above being bare and folded. Condors live upon dead animals and decaying flesh, and like others of their group they are greedy eaters. Often they gorge themselves until too heavy to fly, and if they are attacked they resort to the disgusting practice of disgorging what they have eaten. Their haunts are two or three miles above sea level, the eggs being deposited on bare rock. They generally breed in small flocks. In Southern California is found a closely related species called California vulture.

CONDUCTOR, ELECTRICAL. See ELECTRICITY, subhead *How Electricity Travels.*

CONE, a solid body whose base is a circle and whose sides taper uniformly to a point.



CONE AND FRUSTUM

a, Altitude; b, Perimeter of base; s, Slant height; v, Vertex; l, Lower base; u, Upper base.

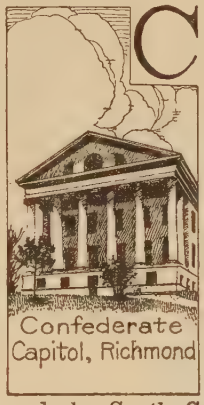
This point, the highest position, is called the *vertex;* the circular bottom is the *base;* the curving and diminishing exterior is the *convex surface.*

The area of the convex surface is equal to the circumference of the base multiplied by half its slant height. The volume of the cone is equal to the area of the base multiplied by one-third its altitude (the perpendicular distance from vertex to base). To find area of base, see the article CIRCLE.

CONE-BEARING TREES. See CONIFERAE, or PINE FAMILY.

CONEY, *ko'nie,* **ISLAND,** one of the most famous pleasure resorts in the world, situated off the south shore of Long Island, nine miles southeast of the Battery, New York City. It is in Kings County, and was annexed to Brooklyn in 1894. Though the name refers to the entire island, the thousands of pleasure seekers who throng there every summer go usually to the section officially called West Brighton. To the average visitor, this gay and crowded district is "Coney." In other parts of the island there are beaches, hotels and residences. Coney Island is of historic interest as the place of Henry Hudson's landing in 1609.

CONFEDERACY, UNITED DAUGHTERS OF THE, a patriotic society of women, banded together to preserve the memory of those who suffered for the South during the Civil War. The society was organized in Nashville, Tenn., in 1894. It is composed of the direct female relatives and lineal female descendants of those who helped the Confederacy by fighting or otherwise. Local chapters are under the direction of state divisions, and these are controlled by a general organization. In 1918 the society had a membership of over 80,000 and 1,300 local chapters.



CONFEDERATE STATES OF AMERICA, a league of states formed in 1861 by eleven American commonwealths which seceded from the Union. The disunion was brought about by the existence of slavery, and was followed at once by four years of the greatest civil war the world has ever known.

The first move in the formation of the Confederate government was made by South Carolina. A convention in that state passed an ordinance of secession on Dec. 20, 1860, and expressed the hope that the other states contemplating secession would join in a federation. Three weeks later the convention of Mississippi indorsed this proposal, as did also the convention of Florida, January 10, 1861. On January 11 the convention of Alabama recommended that the seceding states send delegates to a congress called to meet at Mongomery, Ala., February 4, 1861, to form a federation. South Carolina, Mississippi, Florida, Alabama, Georgia and Louisiana were represented in this convention and organized as a Provisional Congress of the Confederacy.

On February 8 a temporary Constitution was adopted, to be in force for one year from the inauguration of the President, or until a permanent Constitution should be adopted. Jefferson Davis of Mississippi was

chosen temporary President and Alexander H. Stephens of Georgia, temporary Vice-President. The Congress enacted that all laws of the United States in force in the Confederate States on Nov. 1, 1860, and not inconsistent with the Constitution of the Confederacy, be continued in force until repealed or altered by the Confederate Congress. The more important Congressional committees—on war, finance and foreign relations—were appointed at once. During the year 1861 Texas, Arkansas, Virginia, North Carolina and Tennessee passed ordinances of secession and joined the Confederacy. On March 11 a permanent Constitution was adopted by the Congress and submitted to the various states for ratification. This Constitution was in general similar to that of the United States, but different from it in some important respects: The term of the President was fixed at six years, and he was ineligible for re-election; slavery was sanctioned, and slaveholders were given the privilege of taking their slaves into any state or territory; Cabinet officers were given seats in Congress, according to the system prevailing in Great Britain; the states expressly retained their sovereignty. Meantime, the executive departments had been organized, and President Davis had chosen his Cabinet, which represented every state in the Confederacy, among the members being men of exceptional ability, as Robert Toombs and Judah P. Benjamin.

The first important act of the Congress was to make provision for a permanent army. It then devoted itself to seeking foreign recognition and assistance and to building up a financial system for the support of the government. From the first, however, it also sought peace upon the basis of the separation of the North and South, but all efforts in this direction were vain. On Nov. 6, 1861, Davis was chosen permanent President and Stephens permanent Vice-President of the Confederacy, by a unanimous vote. During the next few months the extraordinary demands made upon the government by the war and the necessity of using all the capable soldiers in military capacities led to a decline in the strength of congress as a body, and the consequent centralization of power in the hands of the executive, and especially of President Davis His services, therefore, as head of both the civil and military administrations of the Confederacy, involved tremendous responsibilities, and he was not free from criticism, es-

THE CONFEDERATE STATES OF AMERICA

pecially directed at the gradually growing supremacy of the military over the civil law, and at the extraordinary orders and decrees which he found necessary in order to secure support for the government. The chief difficulties of the Confederacy were due to the lack of funds; for the import duties, which under ordinary conditions would have constituted the chief source of revenue, were almost entirely excluded by the blockade, and there was also a strong sentiment against the imposition of internal taxes. The government was finally compelled to issue vast sums in paper money, or government notes, and to exchange government bonds for provisions and ammunition. The confusion was increased by the issuance by states, cities, banks, corporations and even private citizens, of notes for circulation as money. The decline in value of this money naturally led to fabulous increases in the price of all commodities. During the war the price of flour was at times $400, Confederate money, per barrel, shoes sold at $150 a pair; the use of tea and coffee was practically abandoned; ice was used only by the most wealthy citizens, and such common necessities as coal, wood, medicines and salt were classed as luxuries.

The permanent Senate and House held two sessions, the final adjournment being taken March 18, 1865, about a month before the close of the conflict. The armies of the Confederacy surrendered to the Federal armies, and the struggling government ceased to exist.

The story of the war, told in the article Civil War in America, gives further details regarding the Confederate States. See, also, Slavery.

CONFED'ERATE VET'ERANS, UNITED, a patriotic society composed of veterans of the Confederate army, organized at New Orleans, La., in 1889, for the purpose of strengthening the friendships formed during the war, preserving the memory of dead comrades and aiding veterans and their widows and orphans. The organization is supported by more than 1,800 local *camps,* divided into three departments, and it includes about 50,000 members. It holds annual reunions.

CONFEDERATE VETERANS, UNITED SONS OF, a patriotic society composed of the male descendants of Confederate veterans, organized at Richmond, Va., in 1896, for the purpose of gathering and preserving historic relics and data, from which to write a history of the Civil War from the Southern standpoint. The organization is divided into three departments and many local *camps,* and has a membership of about 50,000. In 1902 it purchased Beauvoir, the home of Jefferson Davis, to be used thereafter as a home for Confederate veterans.

CONFEDERA'TION, ARTICLES OF, the written instrument of government adopted by the thirteen states in America in 1781. The Articles were the work of a committee appointed upon the same day as was the committee to draw up the Declaration of Independence. The Articles were reported to Congress July 12, 1776, but a prolonged debate ensued and they were not adopted until November, 1777. They were then sent to the state legislatures, whose unanimous consent was necessary to their final adoption. By May, 1779, all the states except Maryland had ratified the Articles, but Maryland demanded that states should first cede their territorial claims in the Northwest Territory to the Federal government. This being done, Maryland signed the articles, March 1, 1781.

The articles provided for a "firm league of friendship," under the title *United States of America,* and declared that each state should retain its sovereignty and all the rights and powers which were not expressly delegated to the United States. The government was to be in the hands of Congress, composed of not less than two nor more than seven delegates from a state, each state having, however, but one vote. Though Congress could decide disputes between the states, it had no power to regulate commerce or to raise revenue; it could declare war, but could not raise troops; it could make appropriations, but could not collect taxes; it could pass laws, but could not compel their observance; it could borrow money, but could not guarantee its repayment. Under this weak and decentralized government, conditions in the colonies became grave, and the conviction became widespread that a new government must be formed, possessing more powers than did the one created by the Articles. The result was the Constitutional Convention and the Federal Constitution adopted in 1787. See CONSTITUTION OF THE UNITED STATES.

CONFEDERATION OF THE RHINE, a league of German princes formed in 1806

under the protection of Napoleon, who sought by a combination to create a group of barrier states between France on the one hand and Austria and Prussia on the other. The league was made up of sixteen states, the governing princes of which formed marriage alliances with Napoleon's family. Among these princes were the kings of Bavaria and Württemberg. The formation of the league marked the end of the Holy Roman Empire, but the Confederation itself disappeared on the downfall of Napoleon. All the small states comprising it were later made a part of the German Empire.

CONFUCIUS, *kon fu'she us,* or **KONG-FUT'SE** (550–478 B. C.), a famous Chinese sage, founder of one of the world's great religious systems. He was born in the province of Shantung, then belonging in part to the small vassal kingdom of Lu. His father, who was of royal descent, died three years later, and the boy was reared in comparative poverty by his mother. At the age of seventeen he was made inspector of corn markets, at nineteen he married, and after about four years, in which a son and two daughters were born him, he commenced his career as a teacher. In 517 B. C. he was induced by two members of one of the principal houses in Lu, who had joined his band of disciples, to visit the capital with them, where he had interviews with Lao-tze, the founder of Taoism. Though temporarily driven from Lu to Tsi by a revolution, he soon returned thither with an increased following, and at the age of fifty-two he was made chief magistrate of the city of Chung-too. So striking a reformation was effected by him that he was chosen minister of crime, and with the aid of two powerful disciples, he elevated the state of Lu to a leading position in the kingdom. Its marquis, however, soon after gave himself up to debauchery, and Confucius became a wanderer in many states for thirteen years. In 483 he returned to Lu, but he would not take office, and he passed his last five years in retirement.

CONFUCIUS

Confucius left no work detailing his moral and social system, but he compiled and edited the ancient Chinese classics, called the *Five Books,* and these, together with the *Four Books,* produced by his disciples, make up the Chinese bible. The teaching of Confucius has had, and still has, an immense influence in China, though he can hardly be said to have founded either a religion or a philosophy. All his teaching was devoted to practical morality and to the duties of man in this world in relation to his fellow men; in it was summed up the wisdom acquired by his own insight and experience and that derived from the teaching of the sages of antiquity. Until the revolution which established a republic, Confucianism was the state religion, and to-day it is the ethical basis of the educational system. It has about 256,000,000 adherents.

CONGLOMERATE, *kon glom' er ate,* a term applied by geologists to rocks consisting mostly of water-worn pebbles, or angular fragments cemented together by silica, lime, iron or some other substance, which usually forms the main body of the rock. When the rock contains a large number of pebbles, it is called *pudding stone,* because of its resemblance to a plum pudding. When angular fragments are cemented together, they form *breccia.*

CONGO, *kong'go,* or **KONGO**, the name given to two territories in equatorial Africa. The larger belongs to Belgium, and is known as the BELGIAN CONGO; the other is a French possession, and is now called FRENCH EQUATORIAL AFRICA, also FRENCH CONGO. Both territories were once combined in the Congo Free State. The region was first made known to the world through the explorations of Livingstone and Stanley.

Belgian Congo. This territory was annexed to Belgium in 1908 by the consent of the European powers. It lies entirely inland, the most westerly point in its irregular boundary being about fifty miles from the Atlantic Ocean. It is drained by the mighty Congo River and its tributaries. The equator crosses the country about 300 miles south of the northern boundary. The climate, though warm, is healthful, and the soil is capable of producing abundant crops in great variety. On the higher land cereals are grown, and there are vast areas being developed for fruits and vegetables. The mineral resources are yet practically untouched, but there are great possibilities for the future.

The product which has made the Belgian Congo famous is rubber. The late king Leopold II exploited the rubber industry in a way which gave rise to scandal in connection with the treatment of native laborers. After exposure of conditions following the death of Leopold drastic remedies were applied by King Albert, his successor on the Belgian throne. The only railroad in the territory is in the eastern section, through which runs a portion of the Cape-to-Cairo line. Communication with the ocean is by the Congo River (which see); this is interrupted for 200 miles by rapids.

The area of Belgian Congo is estimated to be 909,654 square miles. The native population, of Bantu stock, is about 7,000,000; the Europeans number about 5,500, of whom over half are Belgians. In 1916 there were 131 American residents. There are scores of languages or dialects among the natives. The principal towns are Stanleyville, Leopoldville, Banana and Boma.

French Equatorial Africa, the portion of the former Congo Free State which belongs to France is described under its title. See LIVINGSTONE, DAVID; STANLEY, HENRY M.

CONGO RIVER, the largest river in Africa, and second only to the Nile in length on the continent. It is one of the very great rivers of the world. The Congo rises in the mountainous region between Tanganyika and Nyassa and flows southwest under the name of the Chambezi River, entering Lake Bangweolo, or Bemba. From here it is continued as the Luapula northward into Lake Moero. The outlet of this lake flowing north receives in its course the great Lualaba. The river has many tributaries, among which are the Aruwimi, the Ubanghi, the Sanga and the Kassai. About eighty miles below Stanley Falls it is joined by the Lomani, and a little east of this point it begins its great bend to the west. About three hundred miles from the mouth of the Congo is Stanley Pool, an enlargement of the river. The total length is perhaps 3,000 miles, of which about one-half is navigable. Navigation is free from the mouth for about ninety miles, where it is interrupted by cataracts and falls, and is free again between Stanley Pool and Stanley Falls. The chief towns on the river are Matadi, Boma and Banana.

CONGREGA'TIONALISTS, THE, a religious denomination, receiving its name from the belief of the members that every congregation of Christians should be an independent body. In England the Congregationalists are known as Independents, the separate churches being formed so that each congregation may have the form of worship which its members desire. Every Congregational Church has the right to elect or depose its officers; to discipline its members, and to determine its own way of worship. There is no appeal to a higher church or to any high church official or conference, but the advice of neighboring churches is often sought. The officers of the church are the pastor, deacons and clerk, a treasurer and a Sunday school superintendent. The expenses of Congregational churches, including the salary of the pastor, are met by voluntary offerings. The local churches are organized into state associations, and a national council meets every three years and is composed of members elected by the state organizations.

In the United States the Congregational Church is relatively strongest in the New England and other Eastern states. It has always stood for higher education, and among the institutions founded by it, or its members are Yale, Dartmouth and Amherst Colleges and Andover Theological Seminary, in the East; and Oberlin College and Chicago Theological Seminary in the central part of the country. The denomination in the United States has about 790,500 communicants, and over 6,000 churches. The world membership is nearly 1,500,000.

CONGRESS, *kon'gres,* an assembly of the delegated representatives of sovereign states, for the purpose of considering matters of international interest. The term is used in America in a slightly different sense, but it has a similar origin, the first congress being that of the delegates from various British colonies, who met Oct. 7, 1765. The name has been applied to many important meetings, at which extensive schemes of future policy were determined by the great powers of the world. To this class belong the famous Congress of Vienna in 1815; that of Carlsbad in 1819, for regulating the affairs of Germany; that of Paris at the end of the Crimean War of 1854–1856; that at Berlin after the Russo-Turkish War of 1877–1878, and that which arranged for the partitioning of Africa in 1885. The word *congress* is often used for *conference.*

CONGRESSIONAL, *kon gresh'un al,* **LIBRARY.** See LIBRARY OF CONGRESS.

CONGRESSIONAL RECORD, the daily printed report of the proceedings of the Congress of the United States. From 1789 to 1824 this was known as the *Annals of Congress;* from 1825 to 1837, as the *Register of Debates;* from 1837 to 1874 as the *Congressional Globe.* It does not contain an accurate record of the actual proceedings of Congress, since members are often allowed the right to insert speeches which they have never delivered, or to revise remarks which they have made before the House.

Any person may subscribe for the *Record,* at $1.50 per month, $4 for the short session of Congress or $8 for the long session. It is furnished free to public libraries.

CONGRESSMAN - AT - LARGE. The Congress of the United States determines the number of members the House of Representatives shall contain for each ten-year period following the taking of the census. Each state is divided into as many districts for election purposes as the number of Representatives allotted to it, and each district chooses one member. If any state is entitled to an additional Representative under a new apportionment it need not defer his election until a new district is created, but may elect him from the state at large. All the voters of the state participate in the election.

CONGRESS OF MOTHERS, NATIONAL. In February, 1897, a group of parents, educators, clergymen and statesmen met in Washington, D. C., to formulate plans for improving the condition and prospects of the children of the country. The leading figures of the gathering were Mrs. Theodore W. Birney and Mrs. Phoebe A. Hearst. A constitution was adopted, in which the aims of the Congress were stated to be as follows:

> The objects of this Congress shall be to raise the standards of home life; to give young people opportunities to learn how to care for children, so that when they assume the duties of parenthood they may have some conception of the methods which will best develop the physical, intellectual and spiritual nature of the child; to bring into closer relations the home and the school, that parents and teachers may coöperate intelligently in the education of the child; to surround the childhood of the whole world with that wise, loving care in the impressionable years of life that will develop good citizens; to use systematic and earnest effort to this end through the formation of Parent-Teacher Associations in every public school and elsewhere, through the establishment of kindergartens, and through distribution of literature which will be of practical use to parents in the problems of home life; to secure more adequate laws for the care of blameless and dependent children, and to carry the mother love and mother thought into all that concerns childhood. The Congress believes that, with the aid of Divine Power, these objects will be accomplished.

As a result of this movement Parent-Teacher Associations have been established throughout the United States, the child-welfare movement has been promoted along various lines, legislation favorable to children has been encouraged, and a Home Education Division of the Bureau of Education established. Since the meeting in 1897 national child-welfare conferences have been held every year, and up to 1917 three international conferences had been held in Washington. See PARENT-TEACHER ASSOCIATION.

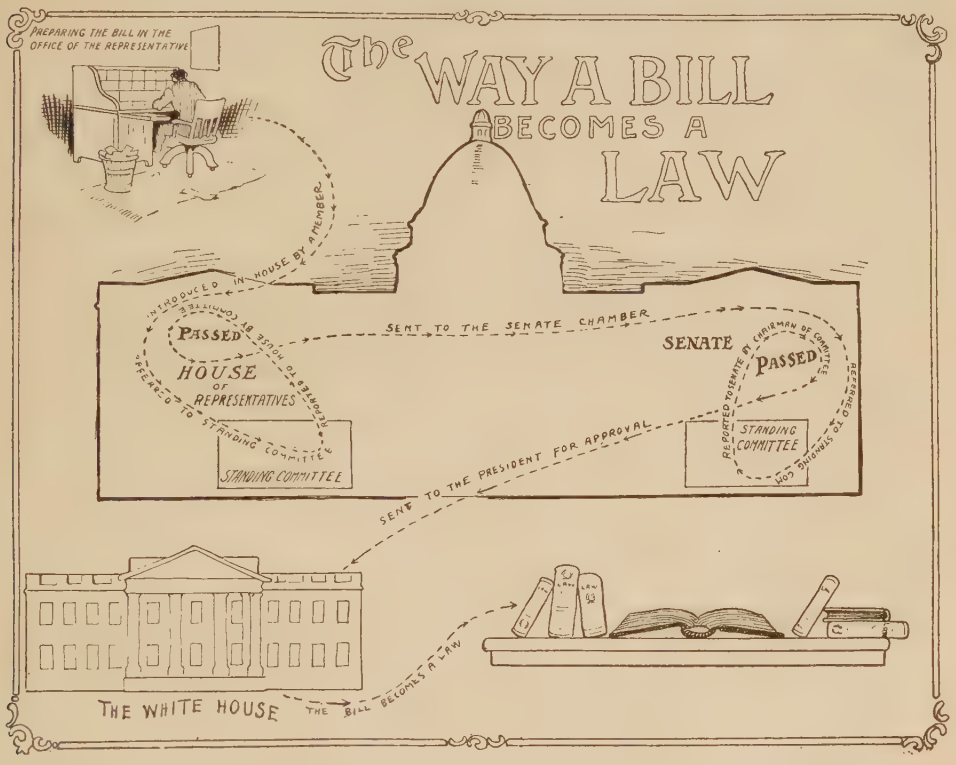
CONGRESS OF THE UNITED STATES, the legislative department of the national government. It is composed of two houses, a Senate and a House of Representatives. (For description of each house, see REPRESENTATIVES, HOUSE OF; SENATE).

The various Congresses of the United States are designated by number, and the life of each Congress is two years from the 4th of March of the odd-numbered years. The Congress which began its life March 4, 1919, and extended to March 4, 1921, was the Sixty-sixth Congress. Members of the House of Representatives are elected in November for the Congress whose life begins in the following March, but they do not take their seats, under ordinary conditions, until the first Monday in December following, which is the day on which Congress convenes in regular session each year. The life of a Congress, therefore, is the length of a term of a Representative. The Senate is a continuous body.

There are two regular sessions of each Congress. The first session is called the *long session,* for it may, if necessary, remain in session a full year—up to the date of the opening of the next regular session in the following December—but in ordinary times adjournment occurs after seven or eight months. The second session is called the *short session,* for when it convenes in December of its second year it must expire by limitation on the 4th of the following March. On the latter date the terms of the members of the House of Representatives

expire, and newly elected members come forward to form the next Congress.

Congress is one of three coördinate departments of the national government, the others being the executive and judical departments, and its powers are clearly set forth in the Constitution of the United States, Article I, Section 8 (see CONSTITUTION OF THE UNITED STATES). The salary of each member of Congress, excepting the presiding officer of each house, is $7,500 per year. The President of the Senate, who is Vice-President of the United States, and the Speaker of the House of Representatives receive $12,000 each.


The WAY A BILL BECOMES A LAW
PREPARING THE BILL IN THE OFFICE OF THE REPRESENTATIVE
INTRODUCED IN HOUSE BY A MEMBER
REFERRED TO STANDING COMMITTEE
PASSED
HOUSE OF REPRESENTATIVES
REPORTED TO HOUSE BY CHAIRMAN OF STANDING COMMITTEE
STANDING COMMITTEE
SENT TO THE SENATE CHAMBER
SENATE
PASSED
REFERRED TO STANDING COMMITTEE
REPORTED TO SENATE BY CHAIRMAN OF STANDING COMMITTEE
STANDING COMMITTEE
SENT TO THE PRESIDENT FOR APPROVAL
THE WHITE HOUSE
THE BILL BECOMES A LAW

How a Bill Becomes a Law. A formal statement of a proposed law is called a *bill*, and under this name is introduced either into the Senate or House of Representatives for passage. To become a law a bill must pass both Houses of Congress and be signed by the President, or be returned by the President without his signature to the House in which it originated, and passed again by both Houses by two-thirds' majority. If passed, it then is called an *act*. The following illustration graphically outlines the progress of a bill from the desk of the Representative who prepared it, through the House of Representatives into the standing committee and back to the House, where it is passed; thence to the Senate, eventually to the White House for the President's signature, and thus becomes a law of the land.

Committees of Congress. A great many thousand bills are introduced into Congress at each session and it would be manifestly impossible for the Houses in open session to give consideration to even a very small portion of them. Committees are therefore named in each House whose duty it is to give particular consideration to such proposed legislation as shall be referred to them. For instance, a bill proposing that a territory be admitted as a state would be sent in each House to the committee on Territories. After a committee has given a bill due consideration, it reports to the House in regular session the result of its deliberations and either suggests that the House pass the bill, or that it be not passed. The recommendation of a committee is usually accepted, although this is not the invariable

rule. After a bill has passed one House and goes into the other, the second House may amend it in any particular, should it so desire, in which event in its amended form the bill must return to the House where it originated and be voted on again in its new form. If the two Houses cannot agree as to the final form a bill is to take, a conference committee of both Houses is usually appointed, and its decision is nearly always accepted.

Powers of Congress. The Constitution definitely prescribes what powers Congress may exercise. It names other powers by implication, and still others that are prohibited or in the exercise of which Congress is restricted. The following outline explains the three divisions:

I. Express Powers.
1. To lay and collect taxes.
2. To borrow money on the credit of United States.
3. To regulate commerce.
4. To establish a uniform rule of naturalization.
5. To establish uniform laws of bankruptcy.
6. To coin money and regulate its value.
7. To fix the standard of weights and measures.
8. To provide for punishment of counterfeiting.
9. To establish postoffices and post roads.
10. To grant patents and copyrights.
11. To establish inferior United States courts.
12. To have charge of matters related to war.
13. To exercise control over United States territory.

II. Implied and Incidental Powers.
1. To purchase foreign territory.
2. To establish military and naval academies.
3. To make internal improvements.
4. To create corporations.
5. To make all laws necessary to carry into effect all powers.

III. Powers Prohibited or Restricted.
1. To suspend the writ of habeas corpus.
2. To pass a bill of attainder.
3. To pass an ex post facto law.
4. To lay direct taxes unless in proportion to the census.
5. To lay taxes on state exports.
6. To give preference to the ports of one state over those of another.
7. To compel vessels to enter any port other than the one bound for.
8. To draw money from the treasury without lawful appropriations being made.
9. To grant titles of nobility.
10. To abridge freedom of speech or of the press.
11. To establish religion or prohibit its exercise.
12. To deny the right of assembling to petition the government.
13. To repudiate debts.

CON'GREVE, WILLIAM (1670–1729), an English dramatist. His plays belong to the artificial school of comedy, which aimed rather at the production of a sustained flow of wit than at the precise delineation of character. The immorality by which they are marred is perhaps the fault of the age rather than of Congreve. The most important of his plays as viewed to-day are *The Old Bachelor, Love for Love* and *The Mourning Bride.*

CONIFERAE, *konif'eree,* or **PINE FAMILY,** a large group of trees and shrubs which are found in the north and south temperate regions, and sparsely within the tropics. By the peculiar structure of their flowers they are separated widely from most of the flowering plants, and with three other small families they are known as gymnosperms. The trees have a somewhat uniform habit of growth. Usually the branches grow out horizontally and diminish in length toward the top, giving a conelike appearance to the whole tree. The leaves are slender and needlelike, or in the form of flat scales; and as on many species they persist through the winter, they have earned for the trees the names of *evergreens.* The name *coniferae,* or cone-bearing, is given these trees because of their peculiar fruit, which is cone-shaped and composed of heavy scales, under which are borne the seeds.

In some species these are long in ripening, and the scales cling firmly together until the seeds are ready for distribution, when the scales open and the seeds are blown about by the wind. The stamens are borne in small and usually inconspicuous cones, which fall as soon as the pollen has been distributed by the wind. They are so removed from the fertile cones that the latter can be fertilized only by the wind, and in consequence the yellowish pollen is composed of countless minute grains which fly about as a yellow dust. Not all the coniferae, however, bear cones. Some, as the juniper, form berries. Some species are very widely scattered, while others are closely restricted to certain localities.

H. R. H THE DUKE OF CONNAUGHT

Related Articles. Consult the following titles for additional information:

Cypress	Pine
Fir	Sequoia
Hemlock	Spruce
Larch	Yew

CONJUNCTION, *kon junk'shun,* in astronomy, the position of two of the heavenly bodies, as two planets, or the sun and a planet, when they are in the same direction from the earth. Sometimes one appears to cover the other, or the two appear to occupy the same spot in the heavens; and when this happens with the sun and the moon we call the phenomenon an *eclipse.* When a star and the moon are in conjunction it is called an *occultation.* When it is simply said that a planet is *in conjunction,* conjunction with the sun is to be understood. The planets nearer to the sun than the earth are said to be in *superior* conjunction or *inferior* conjunction, according as the sun is between them and us, or they are between the sun and us.

CONJUNCTION, in grammar, the part of speech which connects words, phrases, clauses and sentences. They are of two kinds: *coördinate* conjunctions, which connect elements of the same rank, as "The army rushed forward *and* fell upon the enemy;" and *subordinate* conjunctions, which introduce dependent clauses, as "They could not advance *because* the bridges were destroyed." Conjunctions which are used in pairs, as *both—and, not only—but also,* are called *correlative* conjunctions. See LANGUAGE AND GRAMMAR.

CONJUNCTIVITIS, *kon junk ti vi'tis,* or **OPHTHALMIA,** *of thal'mi a,* an inflammation of the mucous membrane of the eye socket and the outer surface of the eyeball. There are a number of distinct varieties of the disease, occasioned by differing causes. These varieties vary from the slight inflammation caused by an acute attack of catarrh to a purulent form that is highly contagious and frequently destroys vision. *Granular conjunctivitis,* or, as it is usually known, *granular lids,* is a contagious trouble, which is readily communicated by towels or wash basins that are not carefully cleaned. This is a common disease in crowded prisons or even in schools that are carelessly supervised.

It need not be acquired by a person who is habitually cleanly and careful in the use of public towels or bathing places, and the disease is promptly curable if intelligent measures are taken. Any eye trouble should have the attention of a reliable oculist.

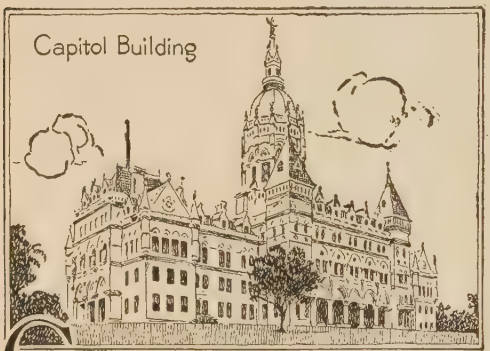
Infection of the eyes of new-born infants frequently assumes a form called *Ophthalmia neonatorum.* Its chief symptoms are discharge of pus and badly-swollen lids. Solution of silver nitrate, applied by a competent nurse or doctor, should be administered at once. Neglect causes total blindness.

CONKLING, ROSCOE (1829–1888), one of America's greatest statesmen of the last half of the nineteenth century, was born in Albany, N. Y. In 1850 he was admitted to the bar and in the same year became district attorney for Oneida County. In 1858 he was elected mayor of Utica and within a few months was rewarded for long political activity by nomination and election to Congress. He served several terms, and in January, 1867, took his seat in the United States Senate, being reëlected in 1873 and in 1879. He vigorously supported Grant in his campaign for the Presidential nomination in 1880, and he was extremely hostile to President Garfield's administration, claiming, with his colleague, Thomas C. Platt, the right to control Federal appointments in his state. They finally resigned their seats in the Senate and appealed to the legislature of New York for a reëlection as a vindication of their course, but they were unsuccessful. Conkling later declined the nomination of Justice of the United States Supreme Court.

CONNAUGHT, *kon'nawt,* ARTHUR WILLIAM PATRICK ALBERT, Duke of, (1850–), son of Queen Victoria, and a Governor-General of Canada, was born at Buckingham Palace on May 1, 1850. He entered the Royal Military Academy, Woolwich, at the age of sixteen and at eighteen was assigned to the Royal Engineers. He then served for a few months with the Royal Artillery, and in August, 1869, was transferred to the Rifle Brigade. He was promoted captain in 1871 and successively won promotion to major, lieutenant-colonel, colonel, major-general and to the rank of general in 1893. In Egypt, in 1882, he commanded the Guards Brigade at the battle of Tel-el-Kebir. He was mentioned several times in despatches, was made Companion of the Bath, and was thanked by Parliament. From 1886 to 1890 the duke was in active command of the Bombay army in India; from 1890 to 1898 he was district commander at home, first of the southern district, later of the Aldershot district. He succeeded Lord Roberts in 1900 as com-

mander-in-chief of the forces in Ireland. Four years later, when the war office was reorganized, the duke was appointed to the newly created office of inspector-general of the forces, which he held until 1909, when he became commander in chief in the Mediterranean. He remained stationed at Malta for two years and then returned to England. On October 13, 1911, he became Governor-General of Canada, retiring in 1918.

CONNEAUT, *kon ne awt',* OHIO, in Ashtabula County, sixty-two miles northeast of Cleveland, near the Pennsylvania state line, on Conneaut Creek, which forms a good Lake Erie harbor, and on the Lake Shore & Michigan Southern, the Nickel Plate and Bessemer & Lake Erie railroads. The first white settlers of Northern Ohio landed here in 1796, and the town was incorporated as a village in 1832. Vast quantities of iron ore are received here from the Minnesota-Michigan fields. The place contains railroad shops, and canning and other factories. Population, 1910, 8,319; in 1917, 9,181 (Federal estimate).



CONNECTICUT, *kon net'i kut,* one of the original thirteen states of the American Union, and one of the smallest in area, larger only than Rhode Island and Delaware. It is popularly called the NUTMEG STATE, because of a legend that once an unscrupulous Connecticut manufacturer made and sold wooden nutmegs. Another name for it is THE LAND OF STEADY HABITS, a compliment to its conservative people from colonial times. The name of the state is from an Indian term meaning *long river,* referring to the Connecticut River, which flows through it from north to south. The state flower is the mountain laurel.

The area of Connecticut is 4,965 square miles, of which 145 square miles are water. The population in 1910 was 1,114,756, which had increased to 1,265,373, by Federal estimate, in 1917. There were, in 1910, 231 people to the square mile, while the entire United States averaged but 31 in each square mile. Six per cent of the population over ten years of age is classed as illiterate, being unable to write; this is largely due to the presence of large numbers of foreigners.

The People. Connecticut is a manufacturing state, hence the people live largely in cities. One-third of the state's inhabitants are in four cities—New Haven, Bridgeport, Waterbury and Hartford. Many foreigners are in these cities. About one-third of the people are of native parentage; an equal number are native born of foreign parentage, and the remainder, excepting 15,000 negroes, are foreign-born.

Surface. Connecticut occupies the southern slope of the hill region of New England, and its surface includes three great river valleys, which cross the state from north to south and are separated from one another by ranges of low hills. In the eastern part of the state is the valley of the Thames, which with its two tributaries drains this part of the state into Long Island Sound. The Connecticut valley occupies the central part of the state. The western part of the state is traversed by the Berkshire Hills, which are a continuation of the range crossing Massachusetts. This region has a diversified surface, the hills being interspersed with numerous valleys containing small streams. There are a number of low mountains in this region, the highest being Bear Mountain, which attains an altitude of 2,354 feet. Other peaks worthy of mention are Gridley Mountain, Riga Mountain, Bradford Mountain, Dutton Mountain and Mount Ball. The southern portion of the state along the coast is quite low and level, but inland the surface is everywhere characterized by low hills, all of which are more or less stony. Along the streams are narrow, level flood plains, usually called meadows.

Climate. The climate is subject to sudden changes, the winters are quite severe and among the hills and mountains the snows are usually deep. The summers are hot. The rainfall is everywhere sufficient. The climate is considered healthful, and the pleasantest season is autumn.

Mineral Resources. Hematite occurs in a

number of places, and some of the iron mines have been worked since 1732. There are also small deposits of lead, nickel, cobalt and other metals, but not in sufficient quantities to pay for working. The brown sandstone, known as brownstone, and valued so highly for the construction of residences, is quarried near Middletown. There are also quarries of granite, marble, flagstone, feldspar and stone suitable for the manufacture of lime and cement. The annual output of mineral products is about $3,300,000.

Agriculture. Agriculture is not a leading industry, but the soil in general is fertile, and most of it is tilled. The chief crops are corn, oats, potatoes, hay and tobacco. The nearness to New York and other large cities affords the Connecticut farmer a good market for garden produce, and truck farming is quite extensive along the streams. Dairying is also an important industry. The tobacco crop is the most remunerative of all agricultural products, being worth to the growers about $11,000,000 each year. Corn is next, worth about $10,500,000.

Manufactures. Connecticut is one of the leading manufacturing states of the Union. According to government statistics it produces more than half of the brass products, more than sixty per cent of the clocks, nearly half of the hardware, over three-fourths of the plated and britannia ware and nearly sixty-five per cent of the needles and pins made in the United States. Besides these industries, others which have attained large proportions are the manufacture of rubber goods, textiles, including cottons, woolens and silk fabrics, and machinery. New London has long had an extensive shipbuilding plant, where some of the largest steamers afloat have been constructed. The development of Connecticut's manufacturing industries is due to her favorable location in reference to large cities, to the abundance of water power and to the ingenuity of her people.

During the World War many of the state's industrial plants were made over for war uses. Shipyards were constructed in all the cities on the Sound.

Transportation. The Connecticut River is navigable for steamers to Hartford, and beyond for small boats, and the Thames is navigable as far as Norwich. The state contains 995 miles of railway, nearly all of

Items of Interest on Connecticut

The Connecticut valley has the most fertile land in New England.

Garnet and quartz are quarried in large quantities in the western part of the state for sandpaper and polishing purposes.

Connecticut produces three-fourths of the tobacco crop of New England, and in value ranks fifth among the states of the Union.

Other important agricultural products are hay, potatoes, orchard fruits, and eggs.

Connecticut formerly led all other states in the production of fur hats, generally known as "derby" and "soft" hats, but it is now second to Pennsylvania. This industry is centered in Danbury, Norwalk and Bethel.

The leading industry of Connecticut is the production of rolled brass and copper, in which it ranks first among the states of the Union.

It is also first in the production of hardware, plated and britannia ware, brass castings and brass finishings, clocks, watches and corsets.

It is second in the manufacture of sewing machines and attachments, cutlery and edge tools, and rubber goods.

Connecticut leads the United States in the special manufacture of small wares such as lamps and reflectors, needles and pins, buttons, and bells, screws and hardware.

Questions

What is the area of Connecticut? Which states are smaller?

What are the principal rivers?

What are the chief agricultural products?

How does Connecticut rank in the production of "derby" and "soft" hats? Clocks? Cutlery? Boots and shoes? Sewing machines?

What can you tell about Hartford, Bridgeport, Waterbury, Ansonia?

What is the importance of New Haven? What are some of its manufacturing industries?

When was Yale University founded?

which is owned or leased by the New York, New Haven & Hartford system. This road owns or controls 850 miles of track. Electric railways are found in all of the important towns, and numerous lines have been constructed connecting adjoining cities. The numerous inlets on the coast provide good harbors, and New London, New Haven, and Bridgeport are important ports. The state carries on an extensive commerce, owing to its great variety of manufactures.

Education and Institutions. Connecticut maintains a good system of public schools, supported in part by income from the state school fund and in part by local taxation. There are normal schools at Danbury, New Britain, New Haven and Willimantic. The state agricultural college is located at Storrs, and among higher institutions of learning the most noted are Yale University at New Haven, Wesleyan University at Middletown, Trinity College at Hartford and Hartford Theological Seminary. See YALE UNIVERSITY.

The state maintains a hospital for the insane at Middletown and a school for the feeble-minded at Lakeville, also two institutions for the deaf and one for the blind. There are also numerous hospitals and sanitariums, and each county has a temporary home for the indigent. The state's prison is at Wethersfield, and there are reformatories at Meriden, Cheshire, Hartford and New Haven. All of these institutions are under the supervision of a state board of charities.

Cities. The largest city and capital of the state is New Haven, which had a population of 152,275 in 1917, according to a Federal estimate. The next five cities, in order of size, were Bridgeport (124,724), Hartford (112,831), Waterbury (89,201), New Britain (55,385) and Stamford (31,810).

Government. Connecticut has been organized since 1637. In 1639 a constitution was adopted which, it is claimed, was the first in the world formed by a social compact. This constitution was confirmed by Charles II in 1662. It was replaced by a state constitution in 1818.

The general assembly consists of a Senate of thirty-five members and a house of representatives of 258 members. The state officers are a governor, lieutenant-governor, secretary of state, treasurer, comptroller, attorney-general, adjutant-general and commissioner of insurance. The term of office is two

years. The supreme court consists of a chief justice and four associate justices.

History. The territory of Connecticut was granted to the Plymouth Company in 1606 and was explored by the Dutch in 1614. In 1623 they established a trading post at Hartford. Meantime, the English had become interested in the region, and in 1631 the land from Narragansett Bay to the Pacific was granted to Lord Say and Sele, who soon afterward founded Saybrook. Early in 1636 Thomas Hooker led his congregation westward from the coast and settled at Windsor, near Hartford. Others followed and established English towns in the neighborhood. English Puritans founded a settlement at New Haven in 1638, which was to be governed largely by the Scriptures.

Both the Connecticut and New Haven settlements expanded, and the former became known as one of the most prosperous and liberal of the New England colonies. Connecticut absorbed New Haven in 1662. In the struggle against the Crown to obtain the charters, Connecticut took a prominent part, and when Governor Andros appeared in 1687 to demand the charter, it was hidden away until 1693. In the French and Indian Wars Connecticut took an active part, and, also, in the pre-Revolutionary discussion. The state furnished the Continental army about 30,000 men, was one of the first to form an independent government (1776); the war governor, Jonathan Trumbull, was one of the closest friends and advisers of Washington.

Connecticut suffered through raids against its defenseless towns, the last one being directed by the traitor Benedict Arnold, in September, 1781. Its representatives, Sherman, Johnson and Ellsworth, were prominent in the Constitutional Convention and proposed the present system of representation by states in the Senate and according to population in the House of Representatives. Connecticut opposed the War of 1812 and was prominent in the Hartford Convention in 1814.

The sentiment of the state was against slavery and in favor of union, when the crisis in the slavery struggle came. The war governor, Buckingham, was a prominent figure in the period. Hartford and New Haven were long the joint capitals of Connecticut, but the former became the sole capital in 1873.

Related Articles. Consult the following titles for additional information:

Ansonia
Berkshire Hills
Bridgeport
Bristol
Charter Oak
Connecticut River
Hartford
Hartford Convention
Meriden
New Britain
New Haven
New London
Norwich
Stamford
Torrington
Waterbury
West Haven
Willimantic

CONNECTICUT RIVER, the largest river in New England. It rises on the north border of New Hampshire, forms the boundary between Vermont and New Hampshire, passes through the west part of Massachusetts and the central part of Connecticut and falls into Long Island Sound. It is about 375 miles long and drains an area of over 1,100 square miles. It is navigable for large steamers for about fifty miles from its mouth. Its chief branches are the Passumpsic, White, Deerfield, Farmington and Chickopee rivers.

CONNECTIVE TISSUE, one of the elementary structures of the body. It forms the bones, cartilages, ligaments and a framework for nervous, glandular and muscular tissue. Connective tissue includes the areolar, adipose, retiform, white fibrous, yellow elastic, cartilaginous and osseous. The *areolar* tissue is widely distributed, as it is found in the true skin, in the outer sheaths of blood vessels and in the mucous membranes. It makes the sheaths for glands, nerves and muscles and connects the finest parts of the different organs. It is composed of bundles of fine fibers, interlacing in every direction. *Adipose,* or fatty, tissue, occurring in nearly all parts of the body, but most abundant under the skin and around the kidneys, is not found in the substance of the lungs and some other organs. It exists in small lobules, or masses, surrounded by areolar tissue. No nerve fibers terminate in the fatty tissue, but it contains blood vessels.

White fibrous tissue is arranged in wavy parallel bundles which give to the surface of tendons the appearance of watered silk. It constitutes the tendons of the muscles, the ligaments around joints, is found in the periosteum, pericardium, the largest tissues around the muscles and the sclerotic coat of the eye. *Yellow elastic* tissue, as its name implies, is very elastic and can often be extended sixty per cent of the length before breaking. It is found in the skin, the trachea, the true vocal cords and in veins. *Cartilaginous* tissue differs from other connective tissue in density and is composed of cells

imbedded in a substance called the matrix (see CARTILAGE). It contains no nerves. It furnishes attachment for muscles and ligaments, binds bones together and keeps the larynx and trachea in their tubular shape. *Osseous* tissue makes the solid part of the bone (see BONE).

CONNELLSVILLE, *kon'elz vil,* PA., a city in Fayette County, fifty-six miles southeast of Pittsburgh, on the Baltimore & Ohio, the Pennsylvania and the Western Maryland & Lake Erie railroads and on the Youghiogheny River. It is in the center of a region noted for its coke, coal and natural gas. The industries center around these, and there are also glass works. A Federal building was erected in 1912; there is a Carnegie Library, and the city has two hospitals. Population, 1910, 12,845; in 1917, 15,876 (Federal estimate).

CON'NOR, RALPH. See GORDON, CHARLES WILLIAM.

CONSCIOUSNESS, *kon'shus nes.* See PSYCHOLOGY.

CONSCRIPTION, *kon skrip'shun,* or **DRAFTING,** terms signifying the enrollment of men for military service by compulsion. In Europe the principle of compelling all citizens to undergo military training and of inducting them into the army for active service in time of war is quite generally accepted, but previous to the World War England resorted to the volunteer system to keep up its relatively-small armies. The various modifications of the conscription system as it is applied in Europe will be found in the article ARMY. In most countries the naval service is maintained by means of volunteers, but this is a matter of sentiment. There is no reason why the conscription principle should not be applied to the navy as well as the army.

Traditionally, the American people have always opposed universal military service, which is conscription in a broad sense, but drafting was resorted to as a necessary measure both in the Revolutionary and the Civil wars. During the Civil War serious draft riots occurred in New York in opposition to conscription, but this opposition was soon crushed. The nation had no cause thereafter to resort to conscription until its entrance into the World War, in April, 1917. It was realized then that the existing military machinery was wholly inadequate to the situation, and in May Congress passed the Selective Conscription Bill, which provided for the registration of all men between the ages of twenty-one and thirty, inclusive.

Under the operation of this law, which the country accepted with remarkable unanimity, 2,400,000 men had been inducted into service and received training up to August, 1918. In that month a second law was passed providing for the registration of men between eighteen and twenty-one and thirty-one and forty-five, inclusive. The second bill passed the Senate unanimously, and in the House only two members voted against it, while the country at large accepted it as the best possible means of bringing the war to a speedy and successful conclusion. The principle of universal military service was thus practically adopted by the passage of these laws. Canada also adopted conscription in 1917. See WORLD WAR.

Some Facts Conscription Developed. Every young man drafted into the army of the United States in 1917 and 1918 was subjected to a rigid physical examination. Almost one-third of them were rejected as unfit for military service, on various physical grounds. Many were found to have flat feet; defective eyesight or impaired hearing caused the rejection of others; thousands possessed unsound lungs or were afflicted with organic heart trouble. Such an alarming condition of the young man-power of America led authorities to confer upon campaigns to assure better physical standards for the generations to come.

Another ominous thing that was discovered was an astonishing percentage of illiteracy among young men of draft age. Many thousands of them could not read the English language sufficiently well to understand routine orders or the manual of arms; a still greater number could not write their names. Such disclosures prompted educators, inspired by the United States Bureau of Education, to prepare plans for widespread educational campaigns which should within a few years almost entirely eliminate illiteracy throughout the country. The lack of education in the army was largely confined to young men of foreign birth or of foreign parentage. From this element the disturbers of the economic and social structure are in the main recruited; education was declared to be the only power which could save democracy—the end for which the vast army was called into being.

Thus conscription taught the lesson that intelligent citizenship and good health is a greater guarantee of peace and equality than guns and trained soldiers.

The peace conference, in Paris, which settled the issues of the World War, determined that conscription should be abandoned in all countries.

CONSERVATION. Until within recent years the attention of Americans had never been directed to the great waste that has taken place in connection with the country's natural resources. Half of the contents of coal mines has been wasted in mining; forests have been carelessly cut over and have been burned; water power has not been utilized or has been given to private enterprises and thus closed to the use of all the people. These first two gifts of nature have been used as freely as though the supply were exhaustless, and the third has been largely ignored by the general public; but there has come an awakening to the necessity of remedying the reckless waste that has already jeopardized the future.

National interest in conservation began in 1908, in which year President Roosevelt called a conference of the governors of all the states and other representative men to meet in Washington to consider measures for preserving the public lands, streams, forests and minerals from monopolies and from unnecessary waste. Following this meeting, on June 8 the President appointed a national conservation commission, consisting of 48 members, representing all the states. This commission organized with Gifford Pinchot as chairman, and was divided into the following sections: water resources, land resources, forest resources and mineral resources. A commission was also appointed to devise plans for the coöperation of the various state governments with the national government.

The Natural Conservation Association was organized in 1909, and has permanent headquarters in New York City. Its purpose is to unite in one great national organization all who take an active interest in the conservation movement. There are also associations which embrace only sections of the country, as the southern and western associations.

The second National Conservation Congress convened in Saint Paul, September 5, 1910, and recommended several important measures, among them being the continuance of the reclamation service, the maintenance of a federal commission empowered to deal with all uses of waters, the withdrawals of public lands pending classification, the separation of surface rights from mineral, forest and water rights and the leasing by the government of public lands containing mineral fuels, iron ores and phosphates.

The third meeting of the Congress was held in Washington in November, 1913, in which the question of conserving and using water power was forcibly debated. The meeting went on record against unregulated monopoly in this natural resource.

CONSERVATIVE, *kon sur'va tiv,* in Great Britain and Canada, the political party which favors the maintenance of existing conditions rather than the introduction of radical reforms, when such conditions are in the main satisfactory. The Conservatives in England are the successors of the Tories. See LIBERAL; TORY.

CONSERVATORY, *kon sur'va tori,* a school giving instruction in all branches of music. Conservatories were originally benevolent establishments attached to hospitals, charitable or religious institutions. In France the musical school established in connection with the Opera in 1795, under the name of *Conservatoire de Musique,* is now the most famous school of music in the world. The Conservatorium at Leipzig is perhaps the most influential in Germany. The most noted American conservatories are the National Conservatory in New York, the New England Conservatory in Boston and the Peabody Institute in Baltimore. The name is also applied in America to a botanical garden or other collection of flowers and shrubs.

CON'SOLE, in architecture, a projecting ornamental bracket, often in the form of a scroll or letter *S.* It is employed to support a cornice, bust, vase or the like, but it is an almost purely decorative element. See CORBEL.

CONSONANT, *kon'so nant,* a letter so named because it is usually sounded in connection with a vowel. Some consonants have hardly any sound, even when united with a vowel, serving then merely to determine the manner of beginning or ending the vowel sounds; as in *ap, pa, at, ta.* In uttering a consonant there is always greater or less

obstruction of the breath by the organs of speech; in uttering a vowel the vocal passage is open, though modified in shape. Because *s*, *z* and *v* are consonants not requiring connecting vowels, they may be considered semivowels. See VOWEL.

CON'SORT, a term derived from the Latin *consors*, meaning *partner*. It is used most commonly to designate the husband or wife of a ruler; for example, it is the title of Duke Henry of Mecklenburg-Schwerin, husband of Wilhelmina of Holland. Prince Albert, the husband of Queen Victoria, was known officially as Prince Consort. The power of a royal consort is usually defined by the legislative body of the nation. This precaution is deemed necessary, since the consort is generally a foreigner.

CONSPIR'ACY, in law, a combination of two or more persons to accomplish an unlawful purpose or a lawful purpose by unlawful means. According to modern statutes it is necessary, in order for the offense to be complete, that some open act to accomplish the object of the conspiracy be committed. To be guilty of conspiracy it is not essential that the object of the conspirators be accomplished. Proof of interest is sufficient. In this case the offense amounts to a felony, and is punishable by imprisonment.

CONSTABLE, *kun'sta b'l*, the title applied to the chief constabulary officer or peace officer of a township; he is elected by the voters annually or biennially. Usually there is a constitutional provision for four constables in each township of a state. They are charged with the maintenance of the public peace and in the prosecution of their duties they arrest offenders, serve warrants, execute writs, etc. The name comes to us from medieval times, where the constable was the keeper or governor of a castle under the sovereign. Later, an officer bearing this title was the first military adviser of the king, and, in the latter's absence, commander in chief of the army. In England, at a date nearer the modern era, the constables had oversight of the king's peace in their several districts.

CONSTANCE, *kon'stahnts*, LAKE, a lake in Central Europe at the north base of the Alps, bounded by Switzerland, Austria and the German states of Bavaria, Baden and Württemberg. It extends northwest and southeast, and at its northwest extremity it divides into two branches, the north being called Ueberlingen See, and the south, Untersee, or Zeller See. The Rhine enters it at the south and flows out at the northwest. Lake Constance is about forty miles long and nine miles wide, and is about 1,300 feet above sea level. It is subject to peculiar risings and falls, which occur suddenly and unexpectedly.

CONSTANTINE, *kon'stan tine*, ARCH OF, a triumphal arch in Rome, dedicated to Constantine, in 315, in memory of his victory over Maxentius. It is the best preserved specimen of ancient Roman monuments, having escaped the ravages of the Middle Ages, probably because Constantine was a Christian emperor.

CONSTANTINE, CAIUS FLAVIUS VALERIUS CONSTANTINUS (274–337), a Roman emperor, surnamed *The Great*. After the death of his father, Constantine Chlorus, in 306, he was chosen emperor of the West by the soldiery and in 325 he became the sole head of the Roman Empire. His administration of internal affairs was marked by a wise spirit of reform and the adoption of Christianity as the state religion. In 329 he removed his capital from Rome to Byzantium, which was called after him Constantinople (see CONSTANTINOPLE). In 337 he died near Nicomedia, leaving his empire to be divided among his three sons, Constantine, Constantius and Constans.

CONSTANTINE I, *kon'stan teen* (1868–), king of Greece from 1913 to 1917. He was the oldest son of George I, who was assassinated on March 18, 1913. In 1889 Constantine married the Princess Sophia, sister of Emperor William II of Germany. Having entered the army, he rose to important commands, and in the war of the Balkan allies against Turkey (1912–1913), his personal bravery and the brilliant successes of his troops made him a public idol. At the outbreak of the World War Constantine had to face many serious problems, and his efforts to keep the country neutral led to a rupture with the pro-ally faction, headed by Venizelos. Finally, in June, 1917, the Venizelists gained the upper hand and forced Constantine to abdicate in favor of his second son, Alexander. The king and his queen then retired to Switzerland. He was the first royal personage to seek asylum in a neutral state; others were destined to follow. See GREECE, subhead *History;* WORLD WAR.

A Public Well

CONSTANTINOPLE, *kon stan ti no'pl,* a celebrated city on the southeastern boundary between Europe and Asia, for over four centuries after 1453 the capital of the Turkish Empire. In 1918, at the close of the World War, Constantinople was occupied by the allies, and its destiny was to be decided by the League of Nations, in connection with the ultimate fate of Turkey. The utter collapse of Turkey toward the end of the war foreshadowed a dismemberment of the empire and a new status for the city so long under Mohammedan sway.

Constantinople occupies a picturesque site on a promontory which juts into the Sea of Marmora. Stamboul, the site of the first settlement, and the Mohammedan center, lies on the south shore of the Golden Horn, a long, narrow inlet of the Bosporus; the latter is the historic strait which connects the Sea of Marmora and the Black Sea. On the north and opposite shore of the Golden Horn lie the suburbs of Galata and Pera, the former a business section, and the latter the modern quarter of the foreigners. Scutari, which is governed as a part of the political district of Constantinople, is a suburb on the Asiatic side of the Bosporus. On three sides Stamboul is surrounded by water, and the fourth and land side is guarded by a double wall erected in 447 by the Emperor Theodosius. The city has thus an admirable situation for commerce and for defense. It has been coveted for centuries by all the European powers, and the alliance of Turkey with Germany in the World War made it a German gateway to the East.

Constantinople of To-day. This great Mohammedan stronghold is often called a "queen of cities," but for many years it was a very unsightly queen. Its more than 300 mosques gave it a most picturesque sky-line, but its streets were narrow, dirty and unsanitary, and modern improvements were entirely lacking. Since the revolution of 1908–1909 much progress in modernization has been made. Many dreary wooden buildings have been replaced by cement structures, a splendid granite-paved bridge joins Stamboul and Galata, and the sounds of electric cars and motor trucks are heard in the streets. In Pera there are many fashionable shops, a striking contrast to the Oriental booths of the Grand Bazar in Stamboul, which has lost some of its former prestige. Of the mosques, the most famous is that of Saint Sophia, which was converted into a mosque in 1453, on the capture of the city by the Turks. Another magnificent mosque is that of Solyman. Besides these, there are the mosques of the Sultana Valide, built by the mother of Mohammed IV, and of Sultan Achmet, the most conspicuous object in the city when viewed from the Sea of Marmora.

Other interesting features are the Museum of Antiquities, in Seraglio Park; the group of government buildings known as the Sublime Porte; the Serpent Column, which the Emperor Constantine brought to the city from Delhi; and a number of fine aqueducts connected with some of the largest underground reservoirs in the world.

In Constantinople there have been middle-class schools for boys for a number of years, and in 1918 five similar institutions for girls were established. A university, founded in 1900, and reorganized in 1918, comprises schools of arts, theology, law, medicine and science. A modern building occupying the Scutari shore of the Bosporus houses the medical department. Robert College is an American institution for men, and there are, besides, various special schools.

Industrially, Constantinople is known for its handmade goods. Factory products are made up chiefly of tobacco goods, iron wares and fezzes. In normal years the export and import trade is immense, as the great harbor, the Golden Horn, can accommodate over 1,000 of the largest ocean liners. There is direct railroad connection with the rest of Europe, and ferry and steamship service is maintained for local transportation. No exact population figures are available, but an estimate of 1,250,000 for city and suburbs is fairly accurate.

History. In mythology the site of Constantinople was reached by the Argonauts, but the first historic event was the founding of a town called Byzantium, by Greek adventurers six centuries before Christ. Darius II invaded the region in 513 B. C., but was only in temporary control of the settlement. The Emperor Constantine, inspired

by the commercial and strategic advantages of the site, selected the place as the capital of his empire in 330, and named it Constantinople (see BYZANTINE EMPIRE).

During the Crusades the city was twice conquered by the Christians, but in 1453 the Turks captured it once for all. At that time hundreds of Greek scholars fled to Christian Europe, and their flight had an important influence on the revival of learning. Then for centuries Constantinople was an important feature of international politics, with the European nations playing against each other and all striving to gain control of this gateway to the East. In 1915 the Allies made a determined effort to capture it by way of the Dardanelles, which joins the Sea of Marmora and the Aegean Sea, but the result was a costly failure. Later in the war the city was bombed by airships from the Asiatic side, but it seemed impregnable to direct attack, and was not occupied until Turkey surrendered.

Related Articles. Consult the following titles for additional information:
Byzantine Empire
Constantine
Dardanelles
Renaissance
Seraglio
Sophia, Church of Saint
World War

CONSTELLATIONS, *kon stel a'shunz,* the groups into which astronomers have divided the fixed stars, and which have received names for convenience in description and reference. It is plain that the union of several stars into a constellation, to which the name of some animal, person or inanimate object is given, must be entirely arbitrary, since the several points (the stars) may be united in a hundred different ways, just as imagination directs. The grouping adopted by the Egyptians was accordingly modified by the Greeks, though they retained the Ram, the Bull, the Dog and others. The Greek constellations were again modified by the Romans, and again by the Arabians. At various times, also, Christianity has endeavored to supplant the pagan system, the Venerable Bede having given the names of the twelve apostles to the signs of the zodiac, and Judas Schillerius having, in 1627, applied Scripture names to all the constellations. The old constellations have, however, been for the most part retained.

The different stars of a constellation are marked by Greek letters, α denoting those of the first magnitude, β those of the second and so on. Stars of the sixth magnitude are the smallest visible to the naked eye. Several stars in a constellation may have also particular names.

This subject is treated more fully in the article astronomy, in which there are charts showing the chief constellations. See, also, Zodiac; Bear, Great; Cassiopeia; Orion.

CONSTIPATION, *kon sti pa'shun,* inactivity of the bowel movements. Constipation is one of the commonest ills of mankind, and is the source of numerous other ills. Its seriousness lies in the fact that it causes the accumulation of waste matter in the intestines, which means the retention in the system of countless hordes of poisonous germs. According to one authority this condition is responsible for premature old age. This theory still lacks positive proof, but that constipation is a direct menace to health is disputed by none. Lack of exercise, carelessness in heeding nature's call, and eating of concentrated foods are common causes of sluggish bowel movements. Change of one's habits is often sufficient to work a cure; hygienic remedies are far preferable to the use of medical laxatives, as the latter tend to aggravate the trouble and afford only temporary relief.

To avoid eating too much bulky food, one should include in the diet a good deal of fruit, vegetables, especially spinach and rhubarb, breads and cereals containing the husks of the grains, such as bran preparations, and cold water. Foods like the above are helpful because they leave a residue which makes bulk in the colon and acts as a stimulant to the bowels. Oils are also useful because they act as lubricants. Various nonabsorbable mineral oils are now on the market, and have proved valuable to many persons suffering from chronic constipation. For those who sit in offices all day, bending exercises and long walks each day are recommended.

CONSTITU'TION, a body of rules by which the activities of a state are governed. It may be either a written instrument of a certain date, or an aggregation of laws and usages which have grown up in the history of the state. Constitutions are of two kinds, considered as to their place in the political system of different states as follows:

(1) Those which constitute the supreme fundamental law, combining and limiting the legislative and executive departments of government.

(2) Those which are only ordinary law, leaving the legislative department supreme in the government.

Of the former class the Constitution of the United States is the greatest example. Of the latter the constitution of Great Britain is typical. In the British system of government Parliament is supreme. Its decrees form a large part of the constitution of the Empire; but the constitution also contains or includes:

(1) Important treaties, such as the acts of union with Scotland (1707) and Ireland (1800).

(2) Decrees of the executive which have been approved or given silent consent until they form a part of the administrative system of the country.

(3) Agreements, declarations and compacts made between the monarch and the people or Parliament, such as the Magna Charta (1215), the Declaration of Rights (1689), the Act of Settlement (1701).

(4) The great body of the common law; (5) many practical methods and means devised for carrying on government activities, but not having the direct legal sanction of any competent authority.

The Constitution of the United States differs in one important respect from the constitutions of the states of the union. The former formed a new government of enumerated or delegated powers, the source of authority being the states. The state constitutions are but instruments placing restrictions upon the powers of government already existing. See CONSTITUTION OF THE UNITED STATES; UNITED STATES, subhead *Government;* SUPREME COURT.

CONSTITUTION, THE, the most famous vessel in the history of the American navy. It was launched October 20, 1797, but was not equipped until the following year. In the war with the Barbary powers it was Commander Preble's flagship and took part in several bombardments of Tripoli. In July, 1812, under the command of Captain Isaac Hull, it engaged in a spirited race with a British squadron and escaped. On August 19 it fought a famous battle with the *Guerriere,* an English frigate under Captain Dacres, off Cape Race. It left the British vessel a total wreck after a contest of a half-hour. In 1828 the *Constitution* was condemned as unseaworthy and was ordered to be destroyed, but popular sentiment, aroused partly by Holmes's poem, *Old Ironsides,* compelled the abandonment of the project, and the *Constitution* was rebuilt in 1833. It was put out of commission in 1855, was again partially rebuilt in 1877 and was stored at the Boston Navy Yard in 1897.

CONSTITUTIONAL UNION PARTY, a name assumed by a remnant of the Whig party in the South in the election of 1861. It held a convention at Baltimore, in which twenty states were represented by delegates, and nominated John Bell of Tennessee for President and Edward Everett of Massachusetts for Vice-President. Its platform announced no definite principles regarding the slavery controversy, but claimed to recognize "no political principle but the Constitution of the country, the union of the states and the enforcement of laws." It received no support in the North, but carried the border states of Kentucky, Tennessee and Virginia. See POLITICAL PARTIES IN THE UNITED STATES.

CONSTITUTION OF THE UNITED STATES, the supreme fundamental law of the United States of America, by which all powers of the national government are established and limited. The objects for which it was written and adopted are completely covered in the Preamble:

"We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defence, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America."

The states, after the Revolutionary War, had been loosely held together by the Articles of Confederation (see CONFEDERATION, ARTICLES OF). The Articles had not been in operation for a year before it was evident that they were in many respects defective as the fundamental law of the states. To remedy them a convention of delegates of all the states was frequently suggested. Such a demand was even made by various state legislatures between 1781 and 1786. In the latter year a resolution of the legislature of Virginia brought together a convention representing a number of states for the purpose of considering ways and means of advancing the commercial interests of the

nation. This meeting was called the Annapolis Convention (which see).

Five states sent delegates, and they reported unanimously that existing faults could not be remedied by any means at hand, as the trouble could be traced directly to the insufficient Articles of Confederation. It was recommended that a larger convention of all the states meet without delay to consider the Articles and amend them. This report attracted wide attention and when it reached the members of Congress it was approved. On February 21, 1787, Congress advised the states to send delegates to a national convention in Philadelphia, and May 14th was named as the date of meeting. The call was—

" * * * for the sole and express purpose of revising the Articles of Confederation and reporting to Congress and the several Legislatures such alterations and provisions therein as should, when agreed to in Congress and confirmed by the States, render the Federal Constitution adequate to the exigencies of Government and the preservation of the Union."

The number of delegates chosen to this convention was sixty-five; ten did not attend. The Convention remained in session until September 17, when its work was completed. It was found impossible to make satisfactory amendment or revision of the Articles of Confederation, and within the short space of four months a new Constitution was written. It was said by Gladstone that no other body of men in all the history of the world, regardless of the time employed, ever devised a system of government so admirable in its plan and so perfect in its operation as came from the hands of these fifty-five American patriots. That there was no unanimity of opinion in the Convention is apparent from the fact that sixteen members refused to sign the completed Constitution or left the convention before it was ready to be signed. The signatures of only thirty-nine of the members were appended to it.

In Article VII it was provided that the Constitution should become effective as soon as it was ratified by nine states. Eventually, all the thirteen states gave it legality, in the following order, by vote of their legislatures:

Delaware, Dec. 7, 1787; unanimously.
Pennsylvania, Dec. 12, 1787; vote, 46 to 23.
New Jersey, Dec. 18, 1787; unanimously.
Georgia, Jan. 2, 1788; unanimously.
Connecticut, Jan. 9, 1788; vote, 128 to 40.
Massachusetts, Feb. 6, 1788; vote, 187 to 168.
Maryland, April 28, 1788; vote, 63 to 12.
South Carolina, May 23, 1788; vote, 149 to 73.
New Hampshire, June 21, 1788; vote, 57 to 46.
Virginia, June 25, 1788; vote, 89 to 79.
New York, July 26, 1788; vote, 30 to 28.
North Carolina, Nov. 21, 1789; vote, 193 to 75.
Rhode Island, May 29, 1790, vote, 34 to 32.

The Constitution in Full. Following is the complete text of the Constitution, as adopted by the Convention and ratified by the states:

ARTICLE I. LEGISLATIVE DEPARTMENT.

Section 1. Congress in General.

All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Section 2. House of Representatives.

1. The House of Representatives shall be composed of members chosen every second year by the people of the several States, and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State legislature.

2. No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

3. Representatives and direct taxes shall be apportioned among the several states which may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose three, Massachusetts eight, Rhode Island and Providence Plantations one, Connecticut five, New York six, New Jersey four, Pennsylvania eight, Delaware one, Maryland six, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

4. When vacancies happen in the representation from any State, the executive authority thereof shall issue writs of election to fill such vacancies.

5. The House of Representatives shall choose their Speaker and other officers; and shall have the sole power of impeachment.

Section 3. Senate.

1. The Senate of the United States shall be composed of two Senators from each State, chosen by the legislature thereof, for six

years; and each Senator shall have one vote.

2. Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class, at the expiration of the fourth year, and of the third class, at the expiration of the sixth year, so that one third may be chosen every second year; and if vacancies happen by resignation, or otherwise, during the recess of the legislature of any State, the executive thereof may make temporary appointments until the next meeting of the legislature, which shall then fill such vacancies.

3. No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

4. The Vice-President of the United States shall be President of the Senate, but shall have no vote, unless they be equally divided.

5. The Senate shall choose their other officers, and also a President pro tempore, in the absence of the Vice-President, or when he shall exercise the office of President of the United States.

6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

7. Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial judgment and punishment, according to law.

Section 4. Both Houses.

1. The times, places and manner of holding elections for Senators and Representatives, shall be prescribed in each State by the legislature thereof; but the Congress may at any time by law make or alter such regulations, except as to the places of choosing Senators.

2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

Section 5. The Houses Separately.

1. Each house shall be the judge of the elections, returns and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner, and under such penalties as each house may provide.

2. Each house may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two-thirds, expel a member.

3. Each house shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either house on any question shall, at the desire of one-fifth of those present, be entered on the journal.

4. Neither house, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two houses shall be sitting.

Section 6, Privileges and Disabilities of Members.

1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall in all cases, except treason, felony and breach of the peace, be privileged from arrest during their attendance at the session of their respective houses, and in going to and returning from the same; and for any speech or debate in either house, they shall not be questioned in any other place.

2. No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased during such time, and no person holding any office under the United States, shall be a member of either house during his continuance in office.

Section 7. Mode of Passing Laws.

1. All bills for raising revenue shall originate in the House of Representatives; but the Senate may propose or concur with amendments as on other bills.

2. Every bill which shall have passed the House of Representatives and the Senate, shall, before it becomes a law, be presented to the President of the United States; if he approves he shall sign it, but if not he shall return it, with his objections to that house in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that house shall agree to pass the bill, it shall be sent, together with the objections, to the other house, by which it shall likewise be reconsidered, and if approved by two-thirds of that house, it shall become a law. But in all such cases the votes of both houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each house respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall become a law, in like manner as if he had signed it, unless the Congress by their adjournment prevent its

return, in which case it shall not be a law.

3. Every order, resolution, or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States; and before the same shall take effect, shall be approved by him, or being disapproved by him, shall be repassed by two thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Section 8. Powers granted to Congress.

The Congress shall have power:

1. To lay and collect taxes, duties, imposts and excises to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts and excises shall be uniform throughout the United States;

2. To borrow money on the credit of the United States;

3. To regulate commerce with foreign nations, and among the several States, and with the Indian tribes;

4. To establish an uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States;

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures;

6. To provide for the punishment of counterfeiting the securities and current coin of the United States;

7. To establish post offices and post roads;

8. To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries;

9. To constitute tribunals inferior to the Supreme Court;

10. To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations;

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water;

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years;

13. To provide and maintain a navy;

14. To make rules for the government and regulation of the land and naval forces;

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrection and repel invasions;

16. To provide for organizing, arming, and disciplining, the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively, the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress;

17. To exercise exclusive legislation in all cases whatsoever, over such district (not exceeding ten miles square) as may, by cession of particular States, and the acceptance of Congress, become the seat of the Government of the United States, and to exercise like authority over all places purchased by the consent of the legislature of the State in which the same shall be, for the erection of forts, magazines. arsenals, dockyards, and other needful buildings; and

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Section 9. Powers denied to the United States.

1. The migration or importation of such persons as any of the States now existing shall think proper to admit, shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

2. The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

3. No bill of attainder or ex post facto law shall be passed.

4. No capitation, or other direct, tax shall be laid, unless in proportion to the census or enumeration herein before directed to be taken.

5. No tax or duty shall be laid on articles exported from any State.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another; nor shall vessels bound to, or from, one State, be obliged to enter, clear, or pay duties in another.

7. No money shall be drawn from the Treasury, but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

8. No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them, shall, without the consent of the Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign State.

Section 10. Powers denied to the States.

1. No State shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No State shall, without the consent of the Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the Treasury

of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No State shall, without the consent of Congress, lay any duty of tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II. EXECUTIVE DEPARTMENT.

Section 1. President and Vice-President.

1. The executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice-President, chosen for the same term, be elected as follows:

2. Each State shall appoint, in such manner as the legislature thereof may direct, a number of electors, equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative, or person holding an office of trust or profit under the United States, shall be appointed an elector.

3. (The electors shall meet in their respective States, and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each; which list they shall sign and certify, and transmit sealed to the seat of government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be the President, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for President; and if no person have a majority, then from the five highest on the list the said House shall in like manner choose the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice-President. But if there should remain two or more who have equal votes, the Senate shall choose from them by ballot the Vice-President. [Superseded by Amendment XII.])

4. The Congress may determine the time of choosing the electors, and the day on which they shall give their votes; which day shall be the same throughout the United States.

5. No person except a natural born citizen, or a citizen of the United States, at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years, and been fourteen years a resident within the United States.

6. In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice-President, and the Congress may by law provide for the case of removal, death, resignation or inability, both of the President and Vice-President, declaring what officer shall then act as President, and such officer shall act accordingly until the disability be removed, or a President shall be elected.

7. The President shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

8. Before he enter on the execution of his office, he shall take the following oath or affirmation:

"I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will to the best of my ability preserve, protect and defend the Constitution of the United States."

Section 2. Powers of the President.

1. The President shall be Commander in Chief of the army and navy of the United States, and of the militia of the several States, when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers, as they think proper, in the President alone, in the courts of law, or in the heads of departments.

3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions which shall expire at the end of their next session.

Section 3. Duties of the President.

He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and

expedient; he may, on extraordinary occasions, convene both houses, or either of them, and in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Section 4. Impeachment.

The President, Vice-President, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

ARTICLE III. JUDICIAL DEPARTMENT.

Section 1. United States Courts.

The judical power of the United States, shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services, a compensation, which shall not be diminished during their continuance in office.

Section 2. Jurisdiction of the United States Courts.

1. The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States, between a State and citizens of another State; between citizens of different States, between citizens of the same State claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign States, citizens or subjects.

2. In all cases affecting ambassadors, other public ministers and consuls, and those in which a State shall be a party, the Supreme Court shall have original jurisdiction. In all the other cases before mentioned the Supreme Court shall have appellate jurisdiction, both as to law and fact, with such exceptions, and under such regulations as the Congress shall make.

3. The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the State where the said crime shall have been committed; but when not committed within any State, the trial shall be at such place or places as the Congress may by law have directed.

Section 3. Treason.

1. Treason against the United States, shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood, or forfeiture except during the life of the person attainted.

ARTICLE IV. THE STATES AND THE FEDERAL GOVERNMENT.

Section 1. State Records.

Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records and proceedings shall be proved, and the effect thereof.

Section 2. Privileges of Citizens, Etc.

1. The citizen of each State shall be entitled to all privileges and immunities of citizens in the several States.

2. A person charged in any State with treason, felony, or other crime, who shall flee from justice, and be found in another State, shall, on demand of the executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

3. No person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Section 3. New States and Territories.

1. New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the jurisdiction of any other State; nor any State be formed by the junction of two or more States, or parts of States, without the consent of the legislatures of the States concerned as well as of the Congress.

2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

Section 4. Guarantee to the States.

The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion, and on application of the legislature, or of the executive (when the legislature cannot be convened) against domestic violence.

ARTICLE V. POWER OF AMENDMENT.

The Congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this Constitution, or, on the

application of the legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress, provided that no amendments which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI.

1. All debts contracted and engagements entered into, before the adoption of this Constitution, shall be as valid against the United States under this Constitution as under the Confederation.

2. This Constitution, and the laws of the United States which shall be made in pursuance thereof; and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

3. The Senators and Representatives before mentioned, and the members of the several State legislatures, and all executive and judicial officers, both of the United States and of the several States, shall be bound by oath or affirmation, to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII. RATIFICATION OF THE CONSTITUTION.

The ratification of the convention of nine States, shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

The Eighteen Amendments. The greatest objection to prompt ratification of the Constitution as adopted by the Convention was that in no part of the document was there a guarantee of certain inalienable rights of the people. It was only on the express understanding that the first Congress to meet should propose amendments covering these demands that several of the states ratified the Constitution. The first ten Amendments were accordingly proposed in 1789 and declared adopted in 1791. The Eleventh and Twelfth Amendments may be practically considered as adopted for the same reasons which compelled the adoption of the first ten. The Eleventh was proposed in 1794, the Twelfth in 1803; they were declared adopted in 1798 and 1804, respectively. The next three were the outgrowth of the Civil War. The Thirteenth was proposed and adopted in 1865; the Fourteenth was proposed in 1866, and adopted in 1868; the Fifteenth was proposed in 1869, and adopted in 1870. The Sixteenth and Seventeenth were adopted in 1913, and the Eighteenth in 1919, effective in 1920. The full text of the Amendments is given below:

ARTICLE I.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

ARTICLE II.

A well-regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed.

ARTICLE III.

No soldier shall, in time of peace, be quartered in any house, without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

ARTICLE IV.

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the person or things to be seized.

ARTICLE V.

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI.

In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

ARTICLE VII.

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reëxamined in any court of the United States, than according to the rules of the common law.

ARTICLE VIII.

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX.

The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

ARTICLE X.

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

ARTICLE XI.

The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by citizens of another State, or by citizens or subjects of any foreign State.

ARTICLE XII.

1. The electors shall meet in their respective States, and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same State with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President, and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the President of the Senate; the President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted; the person having the greatest number of votes for President, shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers not exceeding three on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President.

2. The person having the greatest number of votes as Vice-President, shall be the Vice-President, if such number be a majority of the whole number of electors appointed, and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators; and a majority of the whole number shall be necessary to a choice.

3. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

ARTICLE XIII.

1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

2. Congress shall have authority to enforce this article by appropriate legislation.

ARTICLE XIV.

1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the legislature thereof, is denied to any of the male inhabitants of such State, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

3. No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any State, who having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against

the same, or given aid or comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each house, remove such disability.

4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

ARTICLE XV.

1. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude.

2. The Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XVI.

The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration.

ARTICLE XVII.

1. The Senate of the United States shall be composed of two Senators from each state, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each state shall have the qualifications requisite for electors of the most numerous branches of the state legislatures.

2. When vacancies happen in the representation of any state in the Senate, the executive authority of such state shall issue writs of election to fill such vacancies: Provided, That the legislature of any state may empower the executive thereof to make temporary appointment until the people fill the vacancies by election as the legislature may direct.

3. This amendment shall not be so construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

ARTICLE XVIII.

1. After one year from the ratification of this article the manufacture, sale or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

2. The Congress and the several states shall have concurrent power to enforce this article by appropriate legislation.

3. This article shall be inoperative unless it shall have been ratified as an amendment to the constitution by the legislatures of the several states, as provided in the constitution, within seven years from the date of the submission thereof to the states by the Congress.

[This amendment became effective in January, 1920.]

CONSUL, *kon'sul,* an official appointed by the government of one country to attend to its commercial interests in a city of another country. The duties of a consul are to promote trade; to give advice and assistance, when called upon, to his fellow citizens temporarily there; to uphold their lawful interests and privileges; to transmit reports of trade, industry and navigation to his government; to authenticate certain documents. A consul differs from a diplomatic representative in that the latter has charge of the political relations between the countries represented.

The consular service of the United States is divided into three ranks, *consuls-general, consuls* and *commercial agents.* The first-named have charge of all consuls in a certain district, besides performing the regular duties of a consul; the last-named, though having the same duties and powers as consuls, are not officially recognized by the governments to which they are sent. Within recent years the American consular service has been improved by the adoption of a system whereby men are classified and promoted on the basis of service performed. The old system of purely political appointments has been discarded.

Roman Consuls. These were the two highest magistrates in the Republic of Rome. They were annually elected, at first only from the patricians, at a later period also from the plebeians. The consul was required to be at least forty-five years of age and must have passed through certain inferior offices. These laws, however, were disregarded at various times in Roman history. The insignia of the consul were a staff of ivory, with an eagle at its head, a toga bordered with purple, an ornamental chair and twelve *lictors,* who, with *fasces* and axes, preceded him. At first, the consuls could declare war, conclude peace, make alliances and even order a citizen to be put to death. Though their powers were gradually curtailed, they remained the heads of the Republic—all officers were under them, the tribunes of the people excepted; they convoked the Senate, proposed and executed the laws. In times of emergency they received

unlimited power, and could even sentence to death without trial, levy troops and make war. Under the emperors the consular dignity rapidly declined and became merely honorary.

CONSUMP'TION. See TUBERCULOSIS.

CONSUMPTION, in political economy, is the use of products to satisfy human needs. The use of machinery to manufacture clothing and the wearing of the clothing by the purchasers are both forms of consumption, and each illustrates a different kind of consumption. The employment of machinery to make clothing is an example of *productive* consumption, for the result is production; the wearing out of the clothing, on the other hand, is *final* consumption. The eating of food is another example of final consumption, and it differs from the destruction of food in that a human need is satisfied. Consumption and destruction are therefore not equivalent. The same comparison may be drawn between the burning of wood for fuel and the destruction of trees in a forest fire. Economists also distinguish between useful and harmful consumption. The careless use of a scarce product in wartime is an example of the latter.

CONTAGIOUS, *kon ta'jus,* **DISEASES** are diseases which one may acquire by touching people afflicted with them, or objects contaminated by the patients, or secretions of the patients. Nearly all contagious diseases are germ disorders, or infections. There are some infections, however, which are not acquired by direct contact, and it is thus correct to say that an infectious disease may or may not be contagious. Smallpox, diphtheria, measles, scarlet fever, chicken pox, whooping cough and mumps are typical contagious diseases. The control of epidemics of these diseases has made great progress in recent years as sanitary science has advanced. See SANITARY SCIENCE.

CONTEMPT', an offense against the dignity, order or authority of a court or legislative assembly, usually consisting in failure to obey its specific commands, or in insults. The power of vindicating their authority against contempt is held by all courts.

CONTINENT'AL SYSTEM, a plan devised by Napoleon during the Napoleonic wars with England to exclude Great Britain from all intercourse with the continent of Europe. It began with the Berlin Decree of November 21, 1806, by which the British Islands were declared to be in a state of blockade; all commerce, intercourse and correspondence were prohibited; every Englishman found in France, or in a country occupied by French troops, was declared a prisoner of war; all property belonging to the English was declared fair prize, and all trade in goods from Britain or British colonies was entirely prohibited.

Great Britain replied by Orders in Council, prohibiting trade with French ports and declaring all harbors of France and its allies subjected to the same restrictions as if they were closely blockaded. Further decrees on the part of France, of a still more stringent kind, denationalized all vessels of whatever flag, which had been searched by a British vessel or which had paid duty to Britain, and directed the burning of all captured British goods. These decrees caused extreme indignation and great annoyance, and gave rise to much smuggling, till the fall of Napoleon in 1814. The insistence of England on her Orders in Council was one cause of the War of 1812 with the United States (see WAR OF 1812).

CONTINUATION SCHOOLS, a term used to describe schools intended for people already employed. Of such schools there are two more or less distinct classes—those which provide technical education for people engaged in industrial work, and those which pay more attention to the so-called cultural branches. In Germany, where schools of this type have been common for half a century, those of the former class predominate, as the compulsory laws guarantee a fair general education to everyone. In England schools of both classes are common, and attendance is very large. In the United States much attention has been paid to continuation education, and in many of the cities evening schools are numerous. In some sections working students make arrangements with their employers, whereby they spend part of the working day in school. This is particularly true of students pursuing technical branches.

CONTRABAND OF WAR. Contraband means *prohibited traffic,* or *that which is forbidden.* Contraband of war includes goods which a nation at war knows will be useful to its enemy. Such goods, found on the high seas, are subject to seizure by the enemy. They always include munitions of

war, such as arms and explosives, also uniforms, food destined for soldiers, and any machinery intended in any degree to aid in prosecuting the war. All such goods, directly used in war, are called *absolute contraband.* Another class of merchandise, intended for non-combatants, such as all kinds of foodstuffs, clothing, etc., may be declared *occasional contraband,* by proclamation of any belligerent (see BELLIGERENT).

A nation at war always issues a proclamation stating what goods it declares to be contraband. Neutral vessels may carry contraband goods and may deal with either or both belligerents, if able to do so. Captured goods may be paid for by the captor nation or they may be sold to its citizens and the owners reimbursed with the proceeds. See WORLD WAR.

CON'TRACT, in law, an agreement between two or more persons in which each party binds himself to do or forbear some act, and each acquires a right to what the other promises. Contracts may be in expressed terms or may be implied from the acts of the parties; they may be verbal or written, and at common law both forms are binding, but usually under statute law the promise must be in writing. The law of contract occupies by far the larger place in the commercial law of all nations, and there is general harmony in the principles by which it is governed.

Certain classes of persons are under peculiar disabilities as to the making of contracts:

(1) In common law, contracts made by an infant (a person under twenty-one years) are voidable unless they are in some way for his special benefit or, in particular, for the necessaries of life.

(2) A married woman, being in the eye of the law merged in her husband, cannot bind herself by contract.

(3) Contracts made by a lunatic are void. The same principle is extended to drunkards.

(4) A corporation can make binding contracts only for things or acts connected with the business for which it was especially created and chartered, excepting in cases of "convenience almost amounting to necessity" (see Corporation).

(5) Contracts between citizens of two countries at war are illegal and void.

The making of a contract comprises two acts: first, an offer; second, an acceptance. The offer may be either in oral or written words, or by action which a reasonable person would interpret as meaning a certain definite thing. The acceptance may be either by word or by action. It must be given directly to the offerer or addressed to him and delivered to the usual carriers of communication, such as the mail or telegraph. It constitutes an assent, and the bargain is closed, if it is delivered to the carrier within a time during which it is previously agreed the offer remains open.

Every contract must be founded on a *consideration,* either of money or of some act whereby an advantage accrues to one or both parties. Thus, the promise of a gift for no compensation whatever cannot be enforced at law. However, the law considers such a consideration as love and affection between near relatives a good consideration in certain cases. Certain considerations are held to be insufficient or illegal; among others, the promise to do an unlawful or impossible act is not binding. A contract obtained by fraud, mistake or compulsion cannot be enforced.

Contracts upon certain subjects, or between certain classes of parties, must be *sealed,* that is, signed and sealed by the contracting parties (see SEAL). Certain others, known as *parole contracts,* must be reduced to writing in order to be enforced. Among these are the sale of real estate, contracts to be performed more than one year in the future, the guarantee to pay another man's debt, agreements to confer property on marriage and, in some states, the sale of goods valued at more than a certain amount.

Contracts are void when their subject matter is illegal. Such are contracts forbidden by statute (for instance, betting and gambling); those forbidden by common law (for instance, contracts to commit crime); contracts contrary to public policy (for instance, in restraint of trade; in restraint of marriage; those which pervert the acts of government, such as bribery; those which obstruct the course of justice, and those which are immoral). Certain other contracts are voidable, that is, can be set aside, though not necessarily illegal (for instance, those obtained by mistake, fraud, misrepresentation or compulsion).

CONTRACT LABOR LAW, a statute of the United States relating to the importation of persons from foreign countries who come to the American nation under contract to perform certain labor. The first law of the kind was passed in 1885, and prohibited

the importation only of unskilled contract labor. A new law enacted in 1903 included both skilled and unskilled contract labor. Aliens are welcome to America for the purpose of home-making and ultimate naturalization; it was assumed, as reasons for the passage of this law, that persons reaching America under contract to perform a certain piece of work would return home upon its completion and while here would deprive American citizens of deserved opportunity in like fields.

CONVICT LABOR, the system in force in penitentiaries, of employing prisoners in productive enterprises, in order to keep them from idleness and to make them earn their keeping. Several general plans are in operation in the United States. In the *lease system* the convicts are leased to contractors, who thereupon assume entire responsibility for their care and safe-keeping. The *contract system* is used in two different forms: In one the state furnishes the material and tools, the work being supervised by the contractor; in the other, the *piece-price system,* the contractor furnishes the tools and material, the work is supervised by state officials and the finished product is bought at a fixed price by the contractor. The chief advantages of this plan are that the state avoids risk of loss in selling the products, is not compelled to make investment and furnishes steady employment to its prisoners. The objections, however, are many. It often interferes with prison discipline, it gives the contractor an unfair advantage over his competitors, and it probably tends to reduce wages in the lines in which it is used.

The *public account system* is gaining ground. All materials and equipment are provided by the state; the work is also supervised by the state officials, and the state either uses or sells the product. The *state-use system* is similar to the above, but the products are used exclusively by the state. Finally, there is the *public works and ways system,* whereby convict labor is used in public construction, as road making. The public-account, state-use and public-works systems are in most general use in America.

CONVOLVULUS, *kon vol'vu lus,* a genus of slender, twining herbs with milky juice, bearing bell-shaped flowers. Some species are common weeds; others are cultivated in gardens for their beauty, and still others have strong medicinal properties. This genus gives the name to a large family of plants, many of which are of great interest.

Related Articles. Among the members of this group are the following:

Bindweed	Morning-Glory
Dodder	Scammony
Jalap	Sweet Potato

CONVULSION, *kon vul'shun,* a contortion of the muscles, also called *spasm.* Convulsions manifest themselves in many forms; they are not a disease, but are a symptom of disease. Violent twitchings of the muscles and frothing at the mouth are characteristic features of epilepsy (which see), and facial jerkings accompany Saint Vitus's dance. Then there are the familiar spasms of infants, which often result from indigestion. Many cases of pneumonia, measles and scarlet fever in babies start with spasms. Dr. L. E. Holt, the baby specialist, advises the following treatment for infantile attacks of convulsions:

Keep the child perfectly quiet with ice at the head, put the feet in a mustard bath, and roll the entire body in large towels which have been dipped in mustard water (two heaping tablespoonfuls of mustard to one quart of tepid water), and have plenty of hot water and a bathtub at hand, so that the doctor can give a hot bath if he thinks it advisable.

If the convulsions have continued until the pulse is weak, the face very pale, the nails and lips blue, and the feet and hands cold, the hot bath will be useful by bringing blood to the surface and relieving the heart, lungs and brain.

The temperature should not be over 106° F.; this should always be tested by a thermometer if one can be obtained. Without this precaution, in the excitement of the moment, infants have frequently been put into baths so hot that serious and even fatal burns have been produced. If no thermometer is available the nurse may plunge her arm to the elbow into the water. It should feel warm, but not so hot as to be at all uncomfortable. One-half a teacupful of powdered mustard added to the bath often adds to its efficacy.

CONWAY CABAL, *ka bal',* a conspiracy organized among a group of officers in the American colonial army in 1777, whose chief object was the promotion of its members, especially of General Horatio Gates to supreme command of the Continental Army. The conspiracy took its name from its most active member, Thomas Conway, and included many prominent men, among them General Charles Lee. Other more sturdy patriots, as John and Samuel Adams, though not intimately associated with the cabal, were not averse to its purposes. It accomplished

much evil during its short life, but it was finally crushed, when an exposure of its dishonest methods and its unpatriotic purposes was made.

Thomas Conway (1733–1800), leader of the cabal, was an Irishman by birth. He gained military experience in the French army, and offered his services to America in 1777. Conway was active in the battles of Brandywine and Germantown, but after the discovery of the intrigue he resigned (1778). Soon afterwards he returned to France.

COOK, Frederick A. See North Polar Exploration.

COOK, James (1728–1779), one of the most celebrated of English navigators. He entered the British navy at the age of twenty-seven, and in 1759, as sailing master of the *Mercury,* made a valuable survey of the Saint Lawrence River and the Newfoundland coast. This service led to his appointment to the command of a scientific expedition in the Pacific, and promotion to the rank of lieutenant. In the course of this expedition he visited New Zealand, discovered New South Wales and returned home in 1771 by way of the Cape of Good Hope. In 1772 Captain Cook, then risen to rank of commander in the navy, had charge of another successful voyage of exploration and discovery in the Pacific. In the course of an expedition begun soon after this he attempted to find a northwest passage. On this voyage he also explored the Western coast of North America and rediscovered the Sandwich (now Hawaiian) Islands, on one of which he was killed by natives.

COOK'ERY, the art of preparing food for the table by the use of heat. Cookery makes food more palatable and aids in its digestion. For the purpose of cooking, foods are classified into meats and vegetables, the meats including fish. Cooking meats coagulates the albumen which they contain, breaks up the muscular fiber, so that it is more easily separated and digested, and liberates juices and gases that contribute to its flavor. The general principle to be observed in cooking meats is to coagulate the albumen on the outside, so that it will not allow the juices to escape. This preserves the most nourishing part of the meat within the cut and makes the cooked part more palatable. Meats are cooked by boiling, roasting, baking, broiling, braising and frying. Unless it is desired for soup, the meat should be placed in a hot oven or over a hot fire, or in case of boiling, into very hot water, in order that the albumen on the outside may be coagulated.

The object of cooking vegetables is to break up the starch which they contain and to soften and loosen the fiber. When cooked, starch becomes much more digestible than in the raw state. Vegetables are cooked by boiling, baking or steaming. Most vegetables are best cooked by immersing them in boiling water for a short time and then completing the process at a lower temperature. Dough which contains a raising mixture, such as yeast or baking powder, is either baked or steamed, according to the article (see Bread). Vegetables should not be over-cooked, as over-cooking destroys much of their nutritive value and renders them indigestible.

Further discussion of this subject may be found in the article Domestic Science.

COOLEY, Thomas McIntyre (1824–1898), an American jurist and author and one of the world's authorities on international law, was born at Attica, N. Y. He removed to Michigan and was admitted to the bar of that state in 1846. In 1859 he became professor, and subsequently dean of the faculty, of the law department of the University of Michigan. In 1864 he was appointed to the state supreme bench, and in 1867 he became chief justice. In 1887 he was placed at the head of the interstate commerce commission, but resigned in 1891. His books include treatises on the constitutional limitations upon state legislatures, constitutional law and torts.

COOPER, James Fenimore (1789–1851), the first American novelist who became well known in Europe, sometimes called the "American Scott." He was born in Burlington, N. J., and studied at Yale, but he was not a close student and was expelled from college in his third year. Other things besides books he knew well, and his intimate acquaintance with the forests and his knowledge of the sea, gained while serving in the United States navy, furnished him later with the materials for his novels. After his retirement from the navy just before the War of 1812, he settled at Cooperstown, N .Y., and took to farming.

Having boasted to his wife that he could write a better novel than many of the roman-

tic ones which were appearing in his time, he produced *Precaution,* a tale which was commonplace, because it dealt with phases of English high life with which Cooper was totally unacquainted. It did, however, start him on a literary career, and when in 1821 he turned to tales of adventure in his own country and wrote *The Spy,* he was recognized at once as a novelist of force. In the twenty years that followed Cooper brought out many novels, chief among them *The Pilot* and *The Red Rover,* sea tales, and the *Leatherstocking Tales,* his great series dealing with frontier life in America. This series includes *Deerslayer, The Last of the Mohicans, The Pathfinder, The Pioneer* and *The Prairie,* of which *The Last of the Mohicans* is the best.

JAMES FENIMORE COOPER

After spending seven years in Europe, Cooper returned to the United States and settled in his own home. The superior culture of Europe had made him look with displeasure on the ruggedness of his own country, and he attempted, by articles published in various papers, to explain to his fellow countrymen what he thought they ought to be. The result was, of course, bitter censure, and Cooper, unable to accept criticism, brought numerous lawsuits against those who attacked him. This course brought down upon him much ridicule at home and abroad.

Cooper's writings were immensely popular in their own day and are still very widely read. They were the first novels of forest and prairie life, and while they have many faults, his vivid description and stirring narrative account readily for the enthusiasm with which they were received. It has been objected that his Indians are idealized, and that his characters are not real, but Cooper probably knew his Indians much better than those who criticised him, and it must be admitted that in Natty Bumppo and Long Tom Coffin he has created characters which are worthy of a lasting place among the characters of fiction.

COOPER, Peter (1791–1883), an American inventor, manufacturer and philanthropist, born in New York City. In 1808 he was apprenticed to a carriage maker, and while with him he invented a machine for mortising the hubs of carriages, which proved of great value to his employer. Later, Cooper undertook the trade of cabinetmaking, the grocery business and the manufacture of glue. In connection with the latter he made oil, prepared chalk, whiting and isinglass and became very wealthy. Having purchased 3,000 acres of land in Baltimore, Cooper erected there the Canton iron works, and in 1830 he constructed from his own designs the first locomotive engine ever made in America, the *Tom Thumb.* Soon after this he sold his iron works in Baltimore, and returning to New York built an iron foundry, which he afterward turned into a rolling mill, making the first rolled iron beams for construction purposes.

In 1845 Cooper removed his works to Trenton, N. J., and built three blast furnaces, the largest then known, bought the Andover iron mines and built a railroad through the eight miles of country to bring the ore to his furnaces. He was a liberal promotor of the Atlantic cable and was president of the New York, Newfoundland and London Telegraph Company. In 1853 he founded Cooper Union for the advancement of science and art and erected a fine building for its purposes (see Cooper Union). During the financial agitation following the crisis of 1873 he was active in the Greenback movement, and in 1876 he was the candidate of an independent party for President.

COOPERAGE, the art of making vessels from pieces of wood bound together by hoops. Barrels, casks, tubs, firkins and pails are good illustrations of vessels made by cooperage. The parts of a cask are the staves, the hoops and the heads. The staves are widest in the middle and gradually taper toward the ends. This shape produces the bulge in the cask. When vessels are required which do not have the bulge, the staves are straight. If they are the same width throughout, the vessel is a cylinder. If they are wider at one end, the vessel flares, being larger either at the top or bottom.

Formerly all cooperage was done by hand, the cooper carefully shaping the staves and giving the edges the proper slant to fit them together in the vessel, but now the work is done entirely by machinery. The staves are cut by a saw in the form of a cylinder, having teeth upon one end. They are then cut to the proper length by circular saws and

placed upon an edging machine, which gives them the desired finish. The heads are made by matching the boards and fastening them together with pins and glue. When the glue is dry the boards are placed upon a turntable, where they come in contact with a circular saw which cuts them into the desired shape and also trims the edges so that they will fit into the casks. See BARREL.

COOPERATION, *ko op er a'shun,* in social economics, the association of any number of individuals or societies for mutual profit, whether in the purchase and distribution of commodities for consumption, or in the production of commodities, or in the borrowing and lending of capital among workmen.

The most powerful coöperative force in the industrial system is what economists have termed "the division of labor," and this has its counterpart in the multiform divisions of capital in its application to the maintenance and extension of industry.

Coöperation, as technically understood, occupies a middle position between the doctrines of the communists and socialists on the one hand, and private property and freedom of individual labor and enterprise on the other. It takes its departure from communism at a very definite and significant point. While the latter would extinguish the motive of individual gain and possession in the sentiment of a universal happiness or good and remodel all existing rights, laws and arrangements of society to this end, coöperation seeks to ameliorate the social condition by joining together increasing numbers of associates in a common interest.

The coöperative societies, though attended with the most varied fortune, have greatly increased in number and in amount of business in recent years. The form, objects and rules of these associations are by no means uniform. But the organizations may be divided into three general classes:

(1) **Societies of consumption,** the object of which is to buy and sell to members alone, or to members and non-members under differing conditions, the necessaries of life or the raw materials of their industry.

(2) **Societies of production,** the object of which is to sell the collective or individual work of the members.

(3) **Societies of credit or banking,** the object of which is to open accounts of credit with their members and advance them loans for industrial purposes.

These societies have taken many forms, such as friendly societies, burial societies, arrangements of private firms by which the workmen share in the profits of the employers (more accurately known as *profit-sharing*), and building societies, the object of which is to enable members to become owners of dwelling houses. In recent years numerous coöperative stores and banks have been established in Canada and the United States, but the movement has enjoyed a much wider growth in Europe than in North America.

COOPER UNION, an educational institution established in New York City in 1859 by Peter Cooper, to give working people free instruction in applied science, art and social and political science. The building, situated at the point where the Bowery divides into Third and Fourth Avenues, was erected by Cooper and deeded to the board of trustees. Its cost was $630,000. Since its establishment, the institution has received bequests from a number of Cooper's colleagues; in 1900 it received an additional gift of $600,000 from Andrew Carnegie, so that it now has an endowment of about $3,000,000, and a total property valuation of over $4,000,000. As organized, the Union provides for both day and evening classes and offers the working people of New York means for becoming proficient in applied sciences and technical trades; it also gives them an opportunity to study art, economics, sociology and kindred subjects. Lectures, reading rooms and scientific and art collections are maintained and are open to all patrons of the institution. The average enrollment is about 3,400.

COOSA, *koo'sa,* **RIVER**, a river formed by the junction of the Etowah and the Oostenaula at Rome, Ga. Its course is westward into Alabama and then southward. It unites with the Tallapoosa to form the Alabama. The length of the Coosa is about 335 miles, and it is navigable for small steamers for a part of its course.

COOT, *koot,* or **MUD HEN**, a bird of the rail family, that lives near and on the water, fleeing to the weeds and grasses when alarmed. The common coot of the United States is a dark slate color, almost black on the head and neck. The toes are not webbed, but have white scalloped bands, which nearly meet. The bill is a dull white.

CO'PAL, a gum resin yielded by different trees in Africa, South America, India and Australia, and differing considerably in its qualities, according to its origin. In gen-

eral it is hard, shining, transparent and citron-colored. When dissolved in alcohol or turpentine it makes a beautiful and very durable varnish.

COPENHAGEN, *ko pen ha'gen*, DENMARK, the capital and largest city of the country, situated on the islands of Amager

COOT

and Zealand. The strait separating the two forms an excellent harbor and is crossed by two bridges. The city is handsomely laid out with gardens and fine buildings. It is the seat of the government and the residence of the king. Among the principal buildings are the Church of Our Lady; Holmens Kirke, dating from the seventeenth century; the Church of our Redeemer; the Roseborg Palace; the Exchange, dating from the seventeenth century; the Glyptothek, containing a very choice collection of sculpture; the new art museum; the royal library, containing 540,000 volumes; the National Museum, and the Thorwaldsen Museum, containing Thorwaldsen's grave and a fine collection of his works of art, which he bequeathed to Copenhagen. Copenhagen also contains a university, the only one in Denmark and the oldest one in Northern Europe. It was founded in 1478, and contains a library of 300,000 volumes.

The city is the chief center of Scandinavian literature, science and art. Shipbuilding is extensively carried on here, and there are machine shops, sugar refineries, chemical works and textile factories. The commerce is very important, and more than one-half of Denmark's trade passes through Copenhagen. The name means *merchants' haven*. King Christopher, the Bavarian, in 1443 made the place the capital of the kingdom. It has withstood several sieges, among which was the one by King Charles X of Sweden (1658–1660), when Copenhagen saved the Danish monarchy, and the one by the English in 1807, when a part of the city was destroyed. Population, 1916, 506,390; with suburbs, 605,772.

COPERNICUS, *ko pur'ni kus*, NICHOLAS (1473–1543), a famous astronomer, the first man of science to announce the theory of the movement of the planets about the sun. He was born at Thorn, Poland. Having studied medicine at Cracow, he afterward devoted himself to mathematics and astronomy, and in 1500 he taught mathematics at Rome with great success. Returning to his own country, he entered into holy orders, was made a canon in the Cathedral of Frauenburg and began to work out his new system of astronomy. Doubting that the motions of the heavenly bodies could be so confused and so complicated as the Ptolemaic system made them, he was induced to consider the simpler hypothesis that the sun was the center around which the earth and the other planets revolve.

Besides this fundamental truth, Copernicus anticipated, for he can scarcely be said to have proved, many other of the principal facts of astronomical science, such as the motion of the earth on its axis and the immense distance of the stars, which made their apparent position the same from any part of the earth's orbit. The great work in which Copernicus explained his theory was completed in 1530, but it was not given to the world until twelve years later, because of popular prejudice against new ideas.

COPLEY, *kop'li*, JOHN SINGLETON (1737–1815), an American painter of historical subjects, and of portraits, born in Boston, Mass. He traveled extensively in Europe, and after 1776 he settled in London. He was elected a member of the Royal Academy in 1783. His most celebrated picture is the *Death of Lord Chatham*, now in the National Gallery. Among his famous portraits are likenesses of Mrs. Boylston, in Harvard Memorial Hall, and of Mary Storer, in the Metropolitan Museum.

COPPER, one of the most useful of metals, of a slightly-reddish color and about nine times as heavy as water. This metal is familiar in every household; it forms the

bottoms of teakettles and wash boilers, and other household utensils; the cent of the United States and Canada and the penny of Great Britain are almost entirely of copper (see ALLOY). However, it has more important uses in commerce. It forms a part of many alloys, being one of the ingredients in gun metal, brass and bronze. Electrical machinery and electrical apparatus of all kinds must have copper parts, and the vast mileage of telephone and telegraph wires are of copper. Street-car trolley wires for conveying the electric current are of copper. In war copper is an absolute essential for casings for shells.

It derives its name from the Latin word *cuprium,* the name for Cyprus, the island on which the copper used by the Greeks and Romans was obtained. Next to gold, silver and platinum, copper is the most ductile and malleable of metals. It is more elastic than any other metal except steel, and the most sonorous of all except aluminum. As a conductor of heat and electricity it ranks next to silver. It has a disagreeable odor, and a nauseous metallic taste. It is not acted upon by water, but tarnishes when exposed to the air, becoming covered with a green carbonate.

Distribution. Copper occurs native in crystals, threads and thin plates. In some of the older rocks, blocks of native copper weighing several tons have occasionally been obtained. The ores are numerous and abundant. The most important of these are compounds of copper with silver, oxygen, carbon or iron, such as copper glance, gray copper and copper *pyrites,* or yellow copper. Nearly all of these ores also contain more or less lead and silver, and in their reduction these metals are obtained.

Copper is found in nearly all of the European countries, in Japan, Africa, Australia and South America; but the United States is the leading country in its production and yields about two-thirds of the world's supply. The leading copper regions of the United States in the order of their importance are Arizona, Montana and Michigan. Formerly Michigan stood first in production, with Montana second; now the order is entirely reversed. The three states mentioned supply over four-fifths of the copper output of the United States. Arizona's annual contribution is about 385,000,000 pounds a year; Montana's 280,000,000; Michigan's, 185,000,000 pounds.

Reduction of the Ore. In extracting copper from the rock at the Lake Superior mines, all that is necessary is to crush the rock and separate the copper from it by washing. This is then melted. The process of separating it from ore containing sulphur is somewhat complicated. The ore is first crushed, then concentrated, that is, caused to pass over a number of tables which have a vibratory motion and over which water is flowing. By this process the particles of rock not containing ore are separated out and rejected. The concentrated ore thus obtained is heated to redness, or roasted, for the purpose of driving off the sulphur. The ore is then smelted and an impure copper is obtained. This is usually sent to the eastern markets, where it is refined. Some of the ores are successfully treated by electrolysis (see ELECTROLYSIS), the use of a powerful electric current being employed instead of heat for extracting the metal.

Compounds. There are a number of compounds of copper, and all of them are exceedingly poisonous. Native carbonates, known as *malachite* form beautiful cabinet specimens, since they are of a brilliant green or blue color. Some of the largest pieces of this rock are sometimes cut and polished for mantels and table tops, and quite a good deal of it is used in the manufacture of small ornaments.

COP'PERAS, sulphate of iron or green vitriol, a salt of a peculiar puckery taste and of a fine green color. When exposed to the air it assumes a brownish hue. It is much used in dyeing fabrics black and in making ink, and in medicine as a tonic. The copperas of commerce is usually made by the decomposition of iron pyrites.

COPPER GLANCE, a copper ore of a leadish or iron gray color, containing eighty-one parts copper and nineteen parts sulphur. In the United States it occurs in the copper mines of the Lake Superior region and in the mines of New Mexico and Arizona, near the Gila River, and also in small quantities in New Jersey and Connecticut. Cornwall (England), Sweden and Germany contain deposits. When occurring in crystals copper glance forms beautiful specimens.

COP'PERHEAD, a North American snake, about three feet long, of a golden or bronze color, that has a bright copper-colored head. On the body are V-shaped dark blotches which meet upon the back.

The copperhead is a sluggish snake, appearing usually only at night, and it is not inclined to bite unless frightened or disturbed. It is one of the three poisonous snakes of the Northern states and has many names in different localities; among them are cottonmouth, moccasin and red adder.

COP'PERMINE RIVER, a river of northern Canada, near Copperhead Mountains. It rises in Point Lake and flows into Coronation Gulf in the Arctic Ocean. This river is about three hundred miles long and contains a great number of waterfalls and torrents, which render it useless for travel.

COPPER SULPHATE, *sul'fayt.* See Blue Vitriol.

COPRA, *kop'ra,* the dried kernel of the cocoanut, which yields an oil used in the manufacture of soap and candles. Copra is obtained in large quantities from the islands of the Pacific, and is an important article of commerce. The cocoanut meat is dried in the sun or in a kiln, and also by hot air, the latter method producing a higher percentage of oil. One gallon is the average yield of thirty cocoanuts. The cake remaining after the oil is extracted is utilized as fodder and manure.

COPTS, *kopts,* a class of people, resident in Egypt, who observe a rude form of the Christian religion and who are supposed to be a relic of the old Egyptian race who built the monuments. By association with the Moslems they have acquired many Moslem customs and are losing their distinctness as a people. The men wear a black or brown turban and a long gown, with sometimes a black coat or jacket over it. The women veil their faces in public. They number over 700,000.

COPYING DEVICES, devices for duplicating letters and manuscripts without rewriting them. One of the oldest processes is by the letterpress, which usually consists of a book containing leaves of tissue paper and a press. The instrument to be copied is written in copying ink, either with a pen or upon the typewriter; this ink contains sugar or some other substance that prevents its drying rapidly. After writing, an oil-back is placed under the leaf in the book. The leaf is then dampened and the article to be copied is laid face down upon it, with another oil-back to protect the book from the moisture. The copying book is then placed in a press which works with a lever or screw, and when pressure is applied the writing is transferred to the dampened page of the book. This form of copying is now almost obsolete.

Copies of typewritten letters, etc., are now made on the typewriter by the use of sheets of carbon paper. This paper has one side covered with a coloring matter which, when struck with the die of the typewriter or pressed with a pencil, is transferred to the surface of the sheet lying next to it. In copying, the carbon is laid next to the sheet upon which the writing is produced, with its colored surface lying upon another sheet of paper, and as the writing proceeds either with pencil or typewriter, the ink from the carbon is impressed upon the second sheet of paper. By employing two or three carbons, as many copies can be made from one writing.

Devices for producing a larger number of copies from writing are the hectograph and the mimeograph.

The Hectograph. This device consists of a pad or tablet, made by mixing gelatin and glycerin in proportions of two ounces of gelatin to thirteen ounces of glycerin. The gelatin should be dissolved in water and the glycerin heated before mixing. The mixture should then be boiled for several hours over a salt water bath, then poured into a shallow pan. The ink used is usually an aniline ink containing a small proportion of glycerin. The copy is written upon ordinary paper, which is then laid face down upon the hectograph and carefully rubbed with the hand or a cloth, when the ink is transferred to the surface of the hectograph. The copy is then removed and as paper is pressed down upon the hectograph, a slight portion of the ink adheres to it so as to reproduce the writing. By using care, from fifty to one hundred copies can be made from a single writing.

The Mimeograph. This machine was invented by Thomas A. Edison, and works on the principle of the printing press. It consists of a corrugated steel plate which resembles a very fine file, and a specially prepared linen paper which is coated on one side with paraffin wax. By writing on the paper with a stylus, over the steel plate, the wax is cut through, forming a stencil. The stencil is then placed in a frame and so adjusted that the paper upon which the impressions are to be made is easily placed under it and removed. The ink is applied by a roller similar

to that used in the hand printing press. As the roller moves over the paraffin paper, the ink passes through the stencil, reproducing the writing on the paper beneath. From such a stencil from one hundred to three hundred copies can be made. A recent modification of this mimeograph consists of a rotary apparatus, working very much on the plan of a cylinder printing press. The stencil is made on the paraffin paper by the typewriter. This is then attached to the cylinder and inked upon the inner side. As the cylinder revolves, the stencil is brought in contact with the paper upon which the copy is printed. By one of these devices several hundred copies can be made from one stencil.

The Multigraph, the most perfect device for printing letters or circulars which have the appearance of typewritten documents. The essential feature is a long cylindrical drum, in two parts, one of which revolves. Each drum contains slots running across its face. In the slots of one of these drums metal type reposes; the various letters are pushed into the slots of the stationary drum, and arranged line by line, to compose the subject-matter to be printed. When all the type lines are in position they are made secure. Printing is accomplished by revolving the type drum, after the manner in which a cylinder printing press operates, the sheets of paper passing beneath the drum and receiving the type impression, after the type has come in contact with an inked ribbon.

COPYRIGHT, the legal protection extended to an author or publisher by which he is guaranteed the exclusive right to publish or sell his literary, musical or artistic productions. It is protection against those persons who, if not restrained by penalties, might appropriate the work of others and commercialize it for their own benefit, thus robbing the rightful owners of the fruits of their labor.

In the United States. The Constitution (Art. I, Sec. 8) empowers Congress to—

> " . . .promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

Thus were copyrights and patents made possible in the United States. See PATENT.

The copyright laws have been several times amended, the last time in 1912. To obtain a copyright, send to the Register of Copyrights, Library of Congress, Washington, D. C., for an application blank. Fill out this blank and return it with a postal money order or bank draft for $1.00, and at the same time send two copies of the edition of the publication which is to bear the copyright imprint, which should appear on the title page, or the page following (for example, see this volume). Other details can be obtained from the Register. Dramatic and musical compositions and works of art are subject to the same copyright as books. The exclusive right of performing such compositions not printed, or of causing them to be performed, belongs to the author.

The copyright office does not protect the rights of an author or publisher in court. If copyrighted material is used unlawfully a suit at law in the United States District Court is the means of redress. The copyright office is only a place of record; its records showing the granting of copyrights and priority of ownership are available in the trial of cases, and are accepted by the courts as unimpeachable evidence.

A copyright is granted for a term of twenty-eight years, and it may be renewed one year before its expiration for a like term. After fifty-six years all protection is withdrawn. A work to be copyrighted in the United States must be printed from type set in that country.

In Canada. Copyrights in Canada are issued in a manner similar to the plan employed in the United States. The copyright office is in charge of the Ministry of Agriculture, Trade-mark and Copyright Branch. The fee is $1.00, and the applicant must furnish three copies of the book or musical composition on which protection is requested; if a painting a full description is required. The copyright period is twenty-eight years, with a renewal privilege of fourteen years. A foreign applicant, to obtain a copyright, must print and publish his work in Canada, or it must be reprinted and republished there within one month after publication elsewhere.

International Copyright, a mutual agreement between nations as to copyright privileges. In March, 1891, the United States Congress passed an international copyright act. Under it agreements have been made with most countries by which works may be copyrighted therein, under special rules.

COQUELIN, *ko klaN'*, a distinguished family of French actors.

Benoît Constant Coquelin (1841–1909), the most famous of the family, was trained for the stage at the Paris Conservatoire. After a successful career in France he visited the United States in 1888, winning high praise, and again in 1900–1901 he pleased American and Canadian audiences, this time as Sarah Bernhardt's leading man in her production of *L'Aiglon*. Among other rôles which he portrayed with success were the leading male parts in *The Marriage of Figaro, The Misanthrope, The Barber of Seville* and *Cyrano de Bergerac*. Coquelin was extremely versatile and could adapt himself to a wide range of parts. His acting charmed because of its directness and naturalness, and he had perfect mastery of technique.

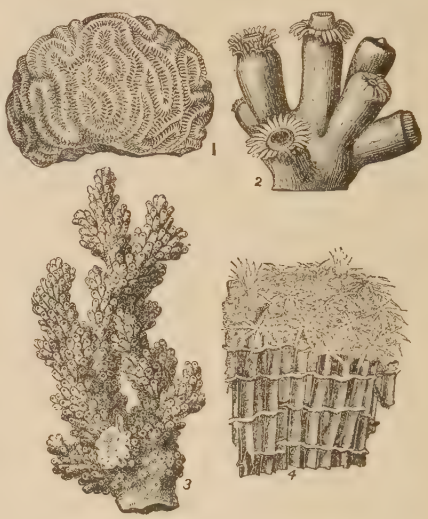
Ernest Alexandre Honoré Coquelin (1848–1909) was a younger brother of the foregoing. He also was trained at the Conservatoire, and at his graduation received the first prize in comedy. He played in a number of dramas with his brother, and also won a reputation as the author and reciter of monologues.

Jean Coquelin (1865–), son of Constant Coquelin, studied under his distinguished father in Paris. In 1897 he created the rôle of Ragueneau in *Cyrano de Bergerac,* and later played in *Thermidor, More than King* and other plays.

CORAL, the limestone skeleton formed by minute sea animals belonging to a family closely resembling sea anemones. The skeletons take many beautiful forms, and coral is a valuable material for jewelry.

The animal, which is really a *polyp,* is commonly known as the coral insect. It consists of a jelly-like mass, in the center of which is a sac which serves as a stomach. Radiating from this are minute arms, which assist the polyp in clinging to the rock and in drawing food into the stomach. There are numerous species of coral polyps, each of which builds a coral peculiar to itself. *Tree* coral, which is so named because it resembles the branches of a tree, is formed by a polyp that propagates by buds, which spring from its sides in such a way as to constitute the branches. Another species forms a coral resembling bundles of straw fastened together, and known as the *organ-pipe* coral. Still another forms a coral resembling in its shape and convolutions the human brain. This is known as the *brain* coral. The most common and widely distributed polyp is that which forms the *reef* coral.

In color corals range from pure white through yellow, pink and red, to black. The pink, red and black varieties are highly



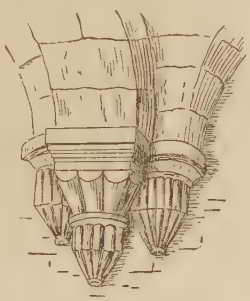
CORALS
1, brain coral; 2, coral showing polyps; 3, tree coral 4, organ-pipe coral.

prized for jewelry and other ornamental purposes. The pink and red are found in the Mediterranean, and because of their value coral fisheries are maintained off the coasts of Southern Europe and of Northern Africa. The corals are procured by a grappling apparatus which is dragged over the bottom of the sea and breaks off the coral and holds it until it can be drawn to the surface. These corals take a high polish and are wrought into jewelry, necklaces and other ornaments, the chief centers of the industry being Naples and Genoa. In value they vary according to their color and fineness, the most beautiful specimens bringing a high price.

Coral reefs are found in nearly all tropical waters, and in some localities, as off the coast of Australia, they are of great extent. The reef-building coral will not live in water that falls below a temperature of 60°. It begins building upon the bottom of the sea and each generation builds upon the skeleton formed by the one preceding it, so that in the course of centuries these

little animals have built up great barriers that rise above the surface of the water. The reef as built by the coral polyp, however, does not approach within five or six feet of the surface, as the animals cannot live above that level. The upper portions of the reef are built up from broken pieces of coral or other rock lodged upon the original reef by the action of the waves. These finally reach the surface; soil is formed by the powdering of the coral; in this earth seeds lodge and plants spring up. Reefs thus built around the coast of submerged volcanoes take a circular form and enclose a lagoon of quiet water (see ATOLL). The study of the various rock formations of the earth shows that the coral polyps have been working for many ages.

COR'BEL, in architecture, a piece of stone, wood or iron projecting from the vertical face of a wall, to support some part of the building. Corbels are of a great variety of forms and are ornamented in many ways. They were used especially in Gothic architecture, and appear in the decorative schemes of modern Gothic buildings in all great cities. See CONSOLE.



CORBEL

COR'CORAN ART GALLERY, a famous collection of works of art in Washington, D. C., founded and endowed with a fund of $900,000 by William W. Corcoran (see below). There are many remarkable sculptures, paintings and ceramics in the collection, which is housed in a beautiful building near the White House. Among the works of great merit are Powers' *Greek Slave* and Velas' *Dying Napoleon*. A free school of art is connected with the institution.

William Wilson Corcoran (1798–1888), founder of the collection, was born in Georgetown, now a part of Washington, D. C. In 1828 he had charge of the real estate held by the United States Bank in the District of Columbia, and continued as their agent until 1836. In 1837 he began his career as banker and broker in Washington, and during the Mexican War, by his connection with the placing of government loans, he acquired an immense fortune. In 1854 he retired from the banking business and gave much of his time to philanthropy.

CORDAY d'ARMONT, *kor da' dahr mahN'*, MARIE ANNE CHARLOTTE (1768–1793), commonly called Charlotte Corday, a famous figure of the French Revolution. She was born in Normandy. Her lover, an officer in the garrison of Caen, was accused by Marat as a conspirator against the Republic and was assassinated by villains hired for that purpose. This, as well as a deep-rooted hatred against all oppressors, determined Charlotte Corday to free her country from Marat. Having obtained an interview with Marat at his own house, she plunged her dagger into his bosom and gave herself up to the attendants who rushed in at his cries. After her trial and conviction she suffered death by beheading. See MARAT, JEAN PAUL.

CORDILLERA, *kawr dil'yah rah*, or *kawr dil'er ah*, or **CORDILLERAS**, a term applied to the mountain system which extends along the western coast of North and South America from Alaska to the southern point of South America. It includes the Rocky Mountains, the Sierra Nevadas and other ranges in the United States, several ranges in Mexico, Canada and Alaska, and the Andes in South America. The term is sometimes used in a more general way to denote any extensive mountain system. The name is from the Spanish for *cord* or *string*. See ROCKY MOUNTAINS; ANDES; SIERRA NEVADAS.

COR'DITE, a powerful smokeless gunpowder, so named because it is manufactured in the form of a cord. It is made up of about eighty parts of nitrocellulose, fifteen of nitroglycerine and five of vaseline. Cordite burns slowly when lighted, but explodes when it strikes its mark, due to pressure. It is used in small arms and in cannon.

COR'DOBA, or **COR'DOVA**, ARGENTINA, capital of a province of the same name. It occupies a beautiful and well-sheltered site in the valley of the Primero, at an elevation of 1,200 feet. Among the notable buildings are a cathedral, a government palace, a library and several hospitals. Here are located a well-equipped national observatory and a national university, founded in 1613. In 1915 it had nearly 600 students. The city is an important commercial center, and it exports quantities of hides, wool and live stock. Among the manufactures are lime, bricks and flour. Population, 1914, 104,894.

COR'DUROY, a thick, cotton stuff, having a cut pile like velvet, but corded or ribbed on the surface. It is a popular fabric for garments worn out of doors, and is sometimes used to cover furniture and for fancy work.

A *corduroy road* in the United States is a rough road over swampy or marshy places, made by laying logs side by side across the driving path.

COREA, or **KOREA**, the name by which Chosen was known previous to its annexation to Japan in 1910. See CHOSEN.

CORELLI, *ko rel'i*, MARIE (1864–), a popular writer of novels of the sensational type. She was born in Italy and was educated in England and France. Charles Mackay, a song writer, adopted her as his daughter in her childhood. Her permanent residence is Stratford-on-Avon. Miss Corelli's first work, *The Romance of Two Worlds*, appeared in 1886. Among her other works are *Thelma, Barabbas, The Sorrows of Satan, The Master Christian, The Life Everlasting* and *The Young Diana* (1917). She is also a proficient musician.

CORIANDER, *ko ri an'der*, a plant of the parsley family, native of Italy and cultivated in other parts of Europe, and to a certain extent in North America. The whole plant has an unpleasant smell, but the fruit, improperly called seed, is very agreeable and aromatic when dry. It is used in medicine as a remedy for dyspepsia, and as an ingredient in cookery and confectionery.

CORINTH, *kor'inth*, the name of a city, gulf and isthmus, well known to the ancient world, and of considerable interest at the present time.

Corinth, the city, was one of the great trading centers of ancient Greece. Situated at the southern tip of the isthmus which joins the Peloponnesus to the northern part of Greece, it possessed all the splendor which wealth and luxury could create, and its citadel, nearly 2,000 feet high, rendered it a strong fortress. It had two harbors, Lechaeum, on the west side of the isthmus, and Cenchreae, on the Gulf of Athens, or Aegina. Corinth was famous as the place where the Isthmian games were held. It was also one of the most magnificent and one of the most voluptuous cities of Greece, but of its famous works of art, there remain only seven massive pillars of a temple to Apollo.

The city was conquered and destroyed by the Roman consul, Mummius, in 146 B. C. Julius Caesar rebuilt it about one hundred years later, but its commerce could not be restored, though it became a place of note and importance. After its conquest in 1458 by Mahomet II, it was held by the Turks till 1823, except from 1687 to 1715, when the Venetians held it. Saint Paul lived here a year and a half, and two of his epistles are addressed to the Corinthians. The present town, called New Corinth, lies three miles northeast of the ancient city of Corinth. Population, about 5,000.

The Gulf of Corinth, or **Gulf of Lepanto**, extends through the center of Greece about eighty miles. Its shores, varied by rocky capes and fertile plains, and its high mountains farther inland, furnish beautiful scenery.

The Isthmus of Corinth, connecting the Peloponnesus with Northern Greece, is about ten miles long and varies in width from four to eight miles. Here, where the wall built to protect it from northern invasions terminated on the gulf, the Isthmian games were celebrated. A canal across the Isthmus, completed in 1893, connecting the gulf of Corinth with the Saronic Gulf, enables the largest vessels to pass through. At the eastern end of the canal is the town of Isthmia, at its western, Poseidonia.

CORINTH, MISS., the county seat of Alcorn County, ninety miles southeast of Memphis. The place had an interesting history in the Civil War. It was a point of strategic importance, since it was the junction of two railroads at right angles to each other. It was fortified by the Confederates, but was evacuated after the Battle of Shiloh, May 29, 1862. On October 3 of the same year, Generals Van Dorn and Price with 22,000 Confederates attempted to recapture Corinth, defended by Rosecrans with 20,000 Federals. In spite of the greatest valor on the part of the Confederate troops, the attack was repulsed. The Confederates lost nearly 5,000 in killed, wounded and captured, while the Union forces lost about 2,500. Population, 1910, 5,020.

CORINTHIAN ORDER. See COLUMN.

CORINTHIANS, *ko rin'thi anz*, EPISTLE TO THE, the name given to two letters which Paul addressed to the Church at Corinth, about A. D. 57. These Epistles were occasioned by dissensions in the Church and by reports brought to Paul of certain un-Chris-

tian practices among the Corinthians. The first Epistle contains the famous chapter (XIII) on love, in which the Apostle says, "And now abideth faith, hope and love, these three; but the greatest of these is love," (Revised version). The second Epistle, which is a continuation of the first, exhorts the people to be steadfast in the faith, and contains personal testimony concerning Paul's own experiences.

CORIOLANUS, *ko ri o la'nus,* the hero of a familiar story of the early Roman Republic. In 491 B. C., when the people were suffering for lack of food, he suggested that they be deprived of grain unless they agreed to give up their tribunes. Coriolanus, to escape the wrath of the people, fled to the Volscians, whose armies he led to the gates of Rome. Only when his aged mother begged him with tears to save the city did he lead the enemy away. Shakespeare's play *Coriolanus* is based on this legend. See TRIBUNE.

CORK. The tough, elastic, woody substance from which are made stoppers for bottles, is the thick bark of a species of oak tree which grows in Spain, Portugal and other parts of Southern Europe and in the north of Africa. Cork is light, elastic, impervious to water, and by pressure can be greatly reduced in bulk, returning again to its original size. It is only one-fourth as heavy as water.

The outer bark of the cork oak falls off of itself if left alone, but for commercial

CUTTING CORK FROM TREE

purposes it is stripped off when judged sufficiently matured, this being when the tree has reached the age of from fifteen to thirty years. The first stripping yields the coarsest kind of cork. In the course of eight or nine years or even less the same tree will yield another supply of bark of better quality, and the removal of this outer bark is said to be beneficial, the trees thus stripped reaching the age of one hundred and fifty years or more.

The bark is removed by a kind of ax, parallel circles being cut round the tree and united by longitudinal cuts, so as to produce oblong sheets of bark. These vary in thickness between three-fourths of an inch and three inches. Care must be taken not to cut into the inner bark or the tree will be killed. The pieces of cork are flattened out by heat or by weights and are slightly charred on the suface to close the pores.

The cork is sorted into different grades, after which it is put into sheet-iron boxes and steamed, so it will not take the temper out of the circular knives or punches which slice up the cork and make it into stoppers. The small bits of cork remaining from a sheet of cork which has been worked into commercial form are granulated for insulating material and for packing for refrigerators.

CORK, a city in the south of Ireland, capital of the county of Cork, situated on the River Lee, 137 miles southwest of Dublin. It is built partly on an island and partly on the banks of the river, which is crossed by nine bridges. It has a large, safe harbor, formed by the estuary of the Lee at the mouth of which is Queenstown. There are in the city four monasteries, a fine cathedral, a free library, schools of science and art, Queen's College, a large park and many beautiful residences. Cork has a large export and import trade. The principal manufactures are leather, iron, glass, gloves, paper and liquors. There are also iron foundries, yards for the building of iron ships and important fisheries. Cork was founded in 622, was taken by Cromwell in 1649 and in 1690 by Marlborough. Population, 1911, 76,673.

COR'LISS, GEORGE HENRY (1817–1888), an American inventor, born at Easton, N. Y. The construction of stationary steam engines was revolutionized by his improvements, the most important being the introduction of a cut-off mechanism, by which the valves are opened and closed instantaneously. Corliss invented many ingenious devices, and fur-

nished the Corliss engine which moved all the machinery at the Philadelphia Centennial Exhibition in 1876.

CORM, from the Greek *kormas,* which means *the trunk of a plant or tree with branches removed,* a name which defines a solid underground stem related to tubers and to bulbs. Corms are very commonly referred to as bulbs, which they closely resemble; they are more properly root-bulbs. Among the conspicuous examples of plants with corms are the gladiolus, cyclamen, crocus and Indian turnip. See BULB.

COR'MORANT, a large web-footed bird, having a long and strongly hooked bill, a long neck, short wings and a rather long, rounded tail. The cormorants, of which there are several species, are excellent swimmers and divers, and yet they often

CORMORANT

perch on trees. In color they are generally black or dark. The double-crested cormorant is found occasionally in the inland waters of the United States and often along the coast. The common European cormorant is larger than a goose, but has smaller wings. The Chinese have for many centuries trained the cormorants to fish for them, which they do very successfully, obediently bringing the fish to their masters without mutilation. When thus employed strings are tied around the necks of the birds, to make it impossible for them to swallow the fish they catch. Two fishermen in one boat can handle fifteen or twenty cormorants with ease.

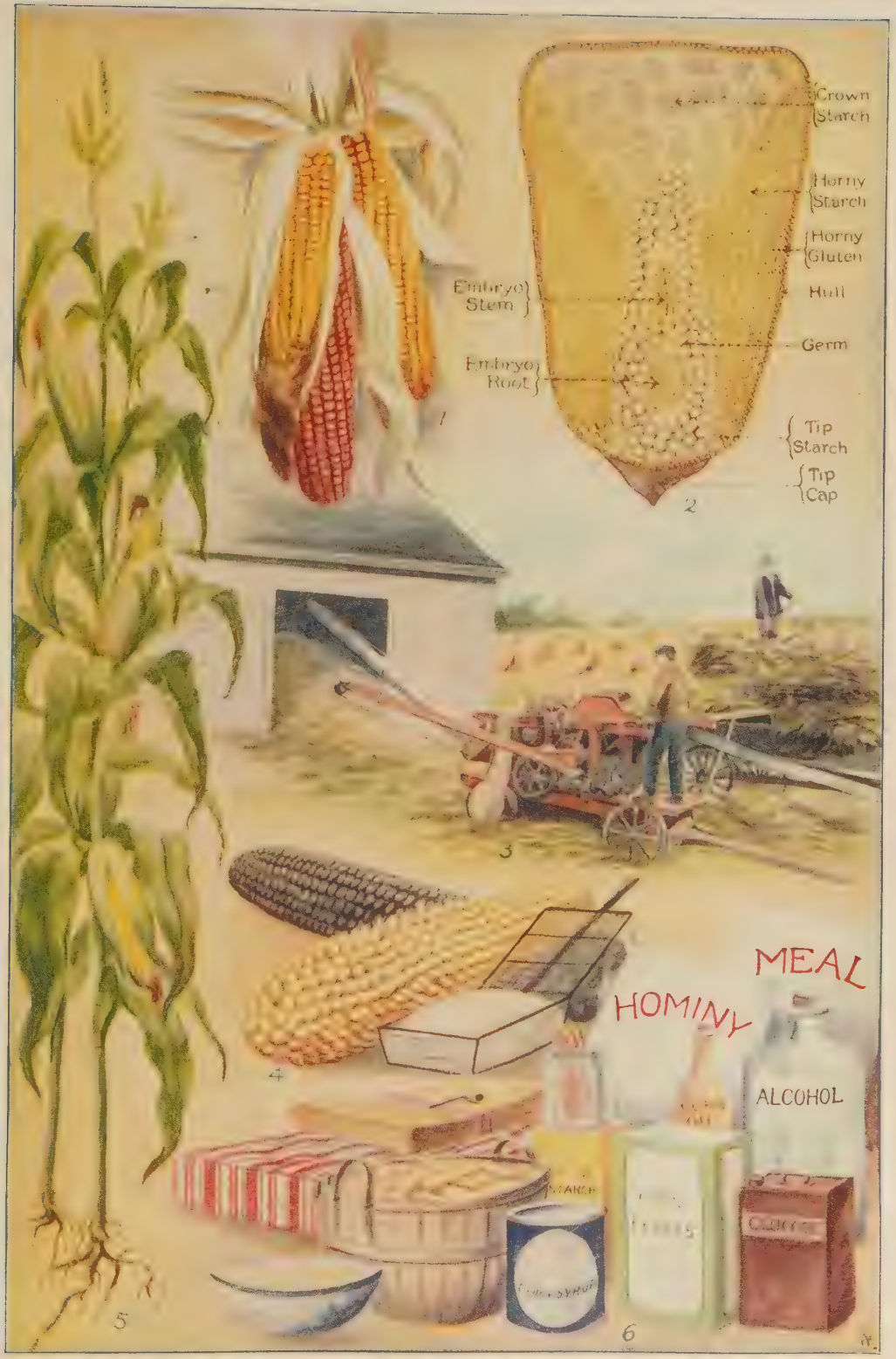
A corn-club boy

CORN, the most important agricultural product of the United States in value of crop, acreage and production, and one of the most valuable food plants in the world. Though it has not the importance of wheat as a bread food, it is the basis of successful farming, for upon it depends the raising of all food animals and therefore the production of such commodities as wool, hides, milk, eggs and butter. And since work animals, too, are fed on corn and hay, the production of other grains is dependent on the corn crop. The corn plant is often used as an emblem of bountiful harvests, and especially as a symbol of the prosperity of the American republic. Edna Dean Proctor's charming poem *Columbia's Emblem* expresses this idea in these lines:

The rose may bloom for England,
The lily for France unfold;
Ireland may honor the shamrock,
Scotland her thistle bold;
But the shield of the great Republic,
The glory of the West,
Shall bear a stalk of the tasseled Corn,
Of all our wealth the best!

Description. Corn belongs to the grass family. In general appearance it resembles the sugar cane and sorghum. The stalks are from four to twelve feet high, according to the variety, are jointed at frequent intervals, are of a dark purple and green color and are concave on one side. Their leaves are long, slender and pointed, and are of a dark green color. The fruit, called the *ears,* grow from the axils of the leaves. Corn bears two kinds of flowers, those at the top of the stalk, bearing the stamens and forming the *tassel,* and those on the ear, constituting the *silk* and bearing the pistils. Each thread of the silk is a pistil which terminates in a kernel. The seeds, or kernels, are arranged in rows around a thick stem called the *cob.* The ears may have eight or twelve or more rows, but they always have an even number. They are covered with long slender glumes called *husks.*

Corn is a native of America and was not known previous to the discovery of the New



CORN

1, Cluster of Ears.
2, Detail of Kernel.
3, Husker and Shredder.
4, Popcorn.
5, Corn Plant.
6, Corn Products.

World. Columbus and other early explorers found it in general use among the Indians, for whom it constituted the chief article of food. From this circumstance it came to be known as Indian corn, but the qualifying term is now heard very seldom. The native name was *maize*, a term still in use in Europe, where *corn* is a general term for grain. In its native state the plant belongs to the warm temperate and semitropical regions, but by cultivation it has been made to extend over a wide range of latitude, in the United States being cultivated as far north as the 46th and 47th parallels.

Varieties. There are a large number of varieties, those adapted to the short seasons of the cool temperate regions being much smaller in stalk and seed than those growing in the warmer portions of the corn belt. The important varieties are the flint corn, dent corn, sweet corn and pop corn. *Flint* corn has a small stalk, seldom exceeding six feet in height, and small, closely compact ears and very hard kernels. Its color is either white or a deep yellow. The yellow variety is the corn generally raised throughout New England, New York and the northern portions of Wisconsin and Minnesota. The *dent corn* contains the largest number of varieties and is by far the most important. This is the corn grown all over the region known as the corn belt of the United States and furnishes nearly all the crop raised in the country. It takes its name from the peculiar form of the kernels, which have an indentation on the outer end and taper to a point. Under suitable conditions the stalks attain a height of from eight to ten feet and sometimes grow as high as twelve or fourteen feet, but this is uncommon. *Sweet* corn contains a larger proportion of sugar than the other varieties, its small kernels are soft and nutritious, and it is raised for food, being eaten green or canned in large quantities. *Pop* corn takes its name from the peculiarity of the kernel of cracking open when heated. The kernels are small and enclosed in an exceedingly tough outside covering. When heated, the steam arising from the moisture in the interior bursts this covering and causes the kernel to turn itself inside out.

Cobless Corn. Not a great deal of attention has been given to the feat of producing corn without the cob on which we have thought Nature intended it to grow. It has been accomplished by Luther Burbank, although he doubts that practical results will be reached. He believes a small cob will be better than entire elimination of the cob. A stalk of cobless corn is shown in the illustration accompanying the article on Burbank.

It is believed that the earliest corn was cobless. Burbank's present cobless corn illustrates the steps backward in evolution towards its original form. The decrease in size of the cob increases the quantity of kernels. It is expected of this corn that instead of merely adding one kernel to the ear it will ultimately double the number of kernels to the ear, for the energy now going to waste in the large cob will be transferred into the production of more kernels. Practically cobless corn offers a great benefit to the farmers, for if there is even one kernel increase to each ear this would mean a total crop increase of 5,000,000 bushels per annum in the United States alone.

Growth and Harvesting. Corn is planted, cultivated and harvested almost entirely by machinery. The seed is planted in rows about four feet apart, and the hills are the same distance from one another. As soon as the young plants appear the cultivation begins and must be continued every few days until the plants become so large that they are liable to injury from the cultivator. The crop is then allowed to ripen. The methods of harvesting depend upon the use for which the crop is intended. If only the ears are desired, the plants may be left standing until the seed is thoroughly ripened and dry. The ears are then broken off, husked and placed in granaries. But if the stalks are desired for fodder, the plants must be cut before the ears are dry, otherwise they will lose much of their nutriment. Corn harvesters are now in general use on the large farms (see CORN HARVESTER). The most complete of these machines not only cut the stalks, but break the ears and remove the husks from them at the same time. Corn is the most economical grain known; its seed requirements are only about one-tenth those of wheat, and it is produced at from fifty to sixty per cent of the cost of wheat.

Corn Products. When ground into meal corn can be served in a great variety of ways. By cracking the kernels *hominy* is made, which is cooked by boiling and usually eaten in milk. By soaking the kernels in a weak lye and rubbing them, the outside coat-

ing or hull is removed, forming *hull corn*, which is now canned in large quantities and extensively used for food. But the most extensive uses of corn are in the manufacture of starch, glucose and alcoholic liquors. Corn oil is made from the germs, which are taken from the kernels in the manufacture of starch and glucose. It is used for burning and other purposes. Corn may be fed to animals either in the ear or when ground into meal. The stalks are of equal value with hay, but need to be cut or shredded and are improved by steaming and mixing with some concentrated food. Green corn is extensively used as fodder in localities where pasturage is scarce, and in nearly all dairy countries it is raised in large quantities for ensilage.

LEADING COUNTRIES IN CORN PRODUCTION

Figures represent millions of bushels grown each year.

Food Value. Corn and wheat have about the same food elements and practically the same food values, as both are rich in starch and sugars (carbohydrates) and in protein. Wheat, however, is rich in gluten, while the reverse is true of corn. It is the sticky property of gluten that makes wheat so admirable a grain for leavened bread, and gives it its superiority as a human food. All preparations of corn flour are very nutritious and well repay using as substitutes for wheat flour.

Production. The United States raises four-fifths of the corn produced in the world. The annual crop of America averages close to 3,000,000,000 bushels, but in 1917, when production was stimulated by the war needs of the allied nations, the crop reached an output of 3,247,512,000 bushels, valued at more than $4,000,000,000. Corn-raising forms the most extensive agricultural industry of the country, the income from this crop exceeding that from wheat and cotton combined, the two next largest crops. The leading corn-producing states are Illinois, Iowa, Missouri, Indiana, Nebraska and Ohio, though the grain is raised in quite large quantities in other states of the Mississippi Valley. Other countries producing corn in considerable quantities are Canada, Mexico, Argentina, Chile, Uruguay, Austria-Hungary, Bulgaria, Rumania, Italy, Russia, Spain, India and China.

The ordinary farmer within the great corn belt produces an average yield of less than 40 bushels per acre. The more careful farmers get an average of about 60 bushels per acre. From the table above it will be noted that while the cost of growing the 60-bushel crop is but slightly greater than the cost of growing the 40-bushel crop, the profits are more than doubled. Yields of 80 bushels per acre are not uncommon in all sections of the great corn belt, and crops of as many as 100 bushels to the acre have been obtained under unusually favorable conditions.

In Canada the average annual yield is about 60 bushels to the acre. The total crop for Canada is generally about 20,000,000 bushels, but the output was reduced during the World War because of shortage of labor. The cost of producing the crop is much higher in Canada, but the net profit is about the same.

STATES LEADING IN PRODUCTION

Figures represent average yield per year, in millions of bushels.

Loss Through Waste. Officials of the United States Department of Agriculture declare that every 100 pounds of cornstalks will yield 6½ pounds of alcohol; in not utilizing this by-product the agriculturist has been allowing a very great amount of wealth to go to waste. No man with the interests of his fellow-being at heart would advocate an increase of the production of alcohol for improper uses. We do not like to think that any helpful drug produces drunkards and all

the ills that follow in the train of drink, but there are many legitimate uses for alcohol, and were it more plentiful and cheaper, the opportunities to use it would multiply.

If one acre of corn will yield from 10 to 12 tons of cornstalks, which is about 20,000 pounds, that amount of raw material would produce easily 1,200 or 1,300 pounds of alcohol, or over 200 gallons. Alcohol is worth at the present time probably 40c per gallon.

If ground in a wet condition, then dried, cornstalks may be kept indefinitely and be held ready at any time for manufacture into alcohol. The alcohol derivable from cornstalks that now go to waste in this country would not only drive all the machinery of our factories, say the government authorities, but would furnish the requisite power for all our railroads, steamboats, run all our automobiles, heat and illumine all our houses and light the streets of every city in the Union.

Experiments are being carried on at the present time to determine whether cornstalks cannot be manufactured into paper on which to print books and newspapers, especially the latter. Very soon it will be necessary for manufacturers to find some acceptable substitute for wood for the manufacture of printing paper, for our forests are rapidly being cut away. Every time a great Sunday newspaper is printed a good-sized forest is destroyed. Experiments thus far made have not determined the value of cornstalks in the manufacture of paper, but manufacturers are hopeful in this direction.

Boys' Corn Clubs. The corn-club movement among American boys was definitely organized in 1909, and within a few years it had enlisted the active interest of over 55,000 boys. Each boy who enrolls is pledged to grow at least one acre of corn, and in caring for this plot he puts into application the most recent principles in regard to plowing, seed selection, spacing, cultivation, fertilization and the keeping of accurate accounts. Demonstration workers, county school superintendents and teachers supervise the work, and the boys are further aided by circulars and bulletins sent out by the United States Department of Agriculture. Prizes are offered for excellent work, the rewards being based on yield per acre, profits, quality of yield and written accounts of work done. The prizes include trips to fairs, corn shows and educational institutions, and animals, farm implements, equipment, banners, books, magazine subscriptions, scholarships in agricultural institutions, etc.

The importance of these clubs lies not only in their educational and disciplinary value, but in the practical benefits resulting from up-to-date farming. Yields of 100 bushels to the acre are common; one boy reported a yield of 229 bushels on a Southern farm. It is an encouraging fact that the better-farming movement receives added impetus wherever corn clubs are maintained.

Essays on Corn

Practical Essay Work. The reason that composition work is often so unsatisfactory, and that pupils consider it the worst kind of drudgery, is because they are assigned themes which they do not understand and upon which they can obtain little or no information. The exhaustive treatment of school subjects in these volumes makes it an invaluable aid to the teacher who wishes to make her work interesting and successful.

Below are given a few essays on corn, prepared after a study of articles and illustrations pertaining to this subject. These essays are given to show teachers how the subjects presented in this work can be used to advantage, and as illustrations of what may be done in other subjects.

The illustrations are simple and such as any pupil will delight in drawing. If, however, the teacher feels unable to supervise work of this kind, very interesting illustrations can be found in catalogues of farm implements and articles in agricultural journals and other periodicals. These can be cut out and pasted on the pages of the essay.

On this and the eight pages following we have endeavored to present these essays in form not more artistic than the work of the average boy and girl can be made. If the student sees that he can write and draw as well as the writing and the illustrations shown herewith, it is a matter of encouragement to him.

By way of special emphasis we would like to state that in a great number of instances the boys and girls are easily discouraged in their attempts at drawing because their efforts fall immeasurably short of the perfection seen in the copy. It is true that a perfect copy leaves no room for doubt as to exact form and detail but for all practical purposes of these essays there is much encouragement lent to the exercise if the students can see in the copy from which they work that which has actually been produced by boys and girls with no better preparation than their own. It is therefore with pleasure that we offer such results in the following pages as may be achieved by every average pupil in any school in sections where corn is grown.

Description of the Corn Plant

Carolyn Ives

Corn is a sort of grass, that is, like wheat, barley, rye and oats, it belongs to the grass family. It is raised in almost every country having a warm or temperate climate.

The plant grows from four to twelve feet high, according to the variety. The stalks are jointed, dark green and purple in color, and are concave on one side. The leaves appear at the joints and partially enclose the stalk where they seem to grow from it. They are long, slender and pointed and when fully grown bend over so as to give the plant a very graceful and beautiful appearance.

Corn has two kinds of flowers: those growing at the top of the stalk and forming the tassel, and those found in the ears. The first kind is called staminate flowers because they bear only stamens. The second kind consist of the silk and constitute the pistilate flowers, because the silk is nothing more nor less than a cluster of pistils, each of which ends in a kernel of corn on the ear.

The ears appear in the axils of the leaves at the joints. They are covered with a kind of leaf called husks. As the corn begins to ripen, the husks open at the top, showing the yellow kernels beneath, and the larger ears because of their weight, bend over so that by the time they are fully ripe they hang downward. The ears begin to form at the lower joints on the stalk, and the lowest ears are the oldest and the highest the youngest.

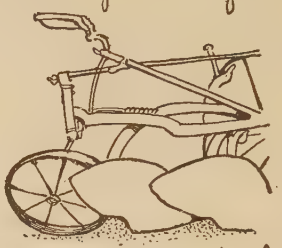
The roots extend far into the ground for the purpose of obtaining moisture and food from the soil. Could a corn plant be removed from the earth so as to have all of its roots joined to it, their number and length would surprise us.

When growing, the corn plant is of a deep green color with a brownish or purplish tassel at the top, and stalks that are purple on one side. The early frosts tend to turn the tips of the leaves and some of the husks a yellowish-brown; this color deepens and increases in extent as the corn becomes ripe. At any season of the year a field of corn is a beautiful sight.

Preparation of the Ground.

Mary Martin

The farmer who looks forward to a good crop of corn uses great care in preparing the ground. The soil must be made mellow and fine so that the roots of the corn can penetrate it and absorb nourishment.



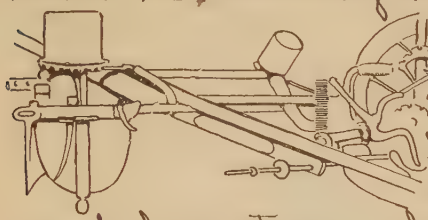
The ground is first plowed to a depth of seven or eight inches. On small farms, where but little corn is raised, the old-fashioned plow, turning but one furrow, is used, but on the large farms in the corn belt, gang plows turning two, three and sometimes more furrows are employed. On ground that has previously been plowed, a gang plow turning three furrows is easily driven by four horses, and can be operated with three horses. The driver rides and controls the team and plow from his seat. Some very large gang plows are hauled by steam engines.

After plowing, the ground is harrowed. If the ground is old and mellow, only a toothed harrow is needed, but on new ground and ground where the soil is hard and lumpy, the disk harrow is used first and is followed by the common harrow. The harrowing is continued until the soil is made fine and smooth for planting.

Planting and Cultivating Corn.

Mary H. Everts

On the small farms in New England and other Eastern states, much of the work is done by hand labor. On the large farms in the corn belt, however nearly all of this work is done by machinery. The corn planter generally used has two wheels and two sharp runners. These runners make a small furrow, into which the seed is dropped from boxes connected with a device known as a checkerboard. These machines are drawn by horses, and the best of them plant four rows at once, and with a good team, a machine will seed about ten acres in a day. For the large dent corn, the rows are four feet apart each way. This gives each hill of corn 16 square feet of ground. Sometimes another kind of planter is used, in which disks take the place of runners, as shown in the picture. In both kinds of planters, the wheels press the soil over the corn in the furrow.



Soon after the corn comes up, cultivating or plowing, as it is usually

called, begins, and continues every few days until the corn is so large that further cultivation is liable to injure the plants by breaking the stalks and disturbing the roots. The corn is then "laid by" until the harvest.

A cultivator is used in plowing corn. It destroys the weeds, and stirs the soil. The cultivator has two wheels supporting a framework, to which beams bearing hoe shaped teeth are attached. The cultivator is drawn by horses and guided by two handles, which extend back from the frame. One or two rows are plowed at a time. After the field is plowed one way it is usually plowed the other way so that the second plowing crosses the first.

The old way of cultivating corn was far different. A cultivator was used to plow between the rows one way; then this left a good part of the work to be done with the hoe. The work was slow and tiresome. If two men hoed an acre of corn in a day they called it a good days work. Later a small cultivator was used, and this removed the weeds between the rows. This method is still used in regions where only small fields of corn are planted.

Harvesting Corn

Thomas Martin

Until within a few years corn was harvested and husked entirely by hand. The ears were broken off and the stalks left standing and were considered worthless. Now, by the use of the corn harvester, the corn is cut and the stalks are pushed under a binding frame, bound and raised on a platform from which the shock is set upon the ground. The corn harvester is similar to the reaping machine, but it works with a slower motion.

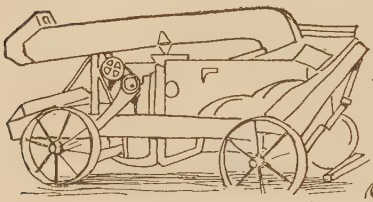
Husking or shredding follows cutting and binding. The shocks are hauled to the farmyard, and the stalks are run through the shredder. This machine breaks the ears from the stalk and removes the husks, dropping them in one place and the clean ears in another.

The part of the machine which does this work so neatly is made up of a frame which has from two to six steel rollers, containing flanges, and so geared that the rollers in each pair turn towards each other. The rollers are about four feet long, and the frame has one end lower than the other, so that the ears, as they are husked, can slide down the incline and drop out. Some shredders have a sheller attached to them, but in order to have this work successfully, the corn must be thoroughly dried before shredding. Usually the farmer prefers to store the corn in the ear in cribs until it is thoroughly dry.

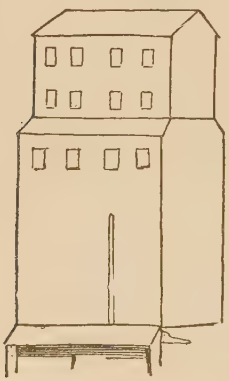
Marketing the Corn Crop

Arthur Clark

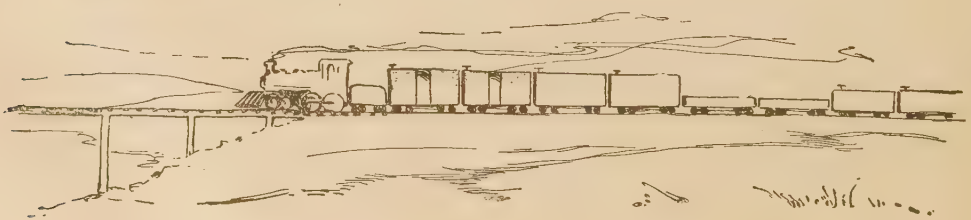
After the corn is husked, it is stored in long, narrow buildings called cribs. The sides of the cribs are made of narrow boards nailed to uprights so as to leave a space about an inch wide between the boards. This allows the air to circulate through the crib and dry the corn.



After the corn is dry, it is shelled by a sheller operated by steam or horse power. The corn is then hauled in wagons to the nearest elevator, from which it is loaded into cars and shipped to large cities. From these centers it is distributed to the mills and manufactories which make the various corn products.



Poor roads are a great hindrance in marketing the corn, and every movement to secure better country roads, and to reduce freight rates is a movement towards giving the farmer greater profits on his crop.



Outline on Corn

I. General Description
- (a) Stalk
  - (1) Height
  - (2) Jointed
  - (3) Color
  - (4) Structure
- (b) Leaves
  - (1) Shape
  - (2) Length
  - (3) Position
- (c) Flowers
  - (1) Silk
  - (2) Tassel
  - (3) Location on stalk
  - (4) Location on ear
- (d) Fruit—Ears
  - (1) Arrangement of kernels
  - (2) Covering
  - (3) Location on stalk

II. History
- (a) Where first cultivated
- (b) When first used by white men
- (c) How introduced to all nations

III. Kinds
- (a) Flint corn
- (b) Dent corn
- (c) Sweet corn
- (d) Pop corn

IV. Planting
- (a) How soil is prepared
- (b) Machinery used in planting
- (c) When planted

V. Cultivation
- (a) Care of corn field
- (b) Extent of care required

VI. Harvesting
- (a) Time of harvest
- (b) Method of harvesting
- (c) Where gathered corn is stored

VII. Where Cultivated
- (a) United States
  - (1) What portion of world's crop?
  - (2) Importance of crop
    - (a) Annual yield
- (b) Canada
  - (1) Extent of crop
- (c) Other countries

VIII. Uses
- (a) As food
  - (1) For mankind
    - (a) Meal
    - (b) Hominy
    - (c) Hulled corn
  - (2) For animals
- (b) Miscellaneous uses
  - (1) Starch
  - (2) Glucose
  - (3) Alcoholic liquors
- (c) By-products
  - (1) Cobs
    - (a) Syrup manufacture
    - (b) For fuel
  - (2) Husks and stalks

Questions on Corn

Why called Indian corn?

How many dishes are made from corn meal in your home?

Start with the farmer and name some of the industries that arise from or are dependent upon corn.

To what family of plants does corn belong?

How does corn rank as a food throughout the world?

What does corn contain that makes it valuable as a food?

How many kinds of flowers has the plant? Which flower forms the tassel? Which the silk? What is at the inner end of each thread of silk?

Do the ears have an odd or even number of rows? How are they covered? Why?

Of what continent is corn a native? What is known of its use among the Aztecs and Incas? How far north is corn now cultivated?

How does corn compare in value with wheat?

What are the results of a failure in the corn crops of the United States?

How is corn planted? Cultivated? Harvested? When does the cultivation begin? Upon what do the methods of harvesting depend? What machines are now in use on the larger corn farms?

What proportion of the world's people use it as food? Give three forms in which it is commonly used.

CORNEA, *kor'ne ah.* See EYE.

CORNEILLE, *kor na'y'*, PIERRE (1606–1684), one of the greatest of French dramatists. Previous to 1636 he had published various comedies and tragedies, which, while they were far superior to the dramas then on the stage, had not established his claim to a high rank. But in 1636 appeared his famous *Cid,* and at once he was recognized as the greatest dramatist which France had thus far produced. After the *Cid, Horace, Cinna* and *Polyeucte* appeared in rapid succession, works which show Corneille's genius at its best. The works which followed added little to his fame. Corneille observed in his tragedies the three unities of the Greeks, making his action take place within twenty-four hours and within one town, and relating every incident to a central plot.

CORNE'LIAN. See CARNELIAN.

CORNELL, *kawr nel'*, **UNIVERSITY**, a coeducational university, founded at Ithaca, N. Y., through the generosity of Ezra Cornell (see below). When he offered his endowment fund of $500,000 he stated that he wished to "found an institution where any person can find instruction in any study." The university thus had a practical basis, a feature not common in 1865, when the institution was incorporated. Since that time it has received other generous gifts, including a fund of $1,175,000 from Henry W. Sage, $500,000 from Oliver H. Payne, and $350,000 from George F. Baker. The annual income is now close to $750,000, and the productive funds aggregate over $15,000,000. The university buildings occupy a beautiful campus overlooking Cayuga Lake.

The departments of the institution comprise the graduate department, the colleges of arts and sciences, law, medicine, agriculture, architecture and civil engineering, the New York State Veterinary College and the Sibley College of Mechanical Engineering and Mechanic Arts. In the fall of 1917 the student enrollment in all departments was over 3,800, and the faculty numbered 750, but the entrance of America into the World War materially reduced the attendance, as was true of all the other American universities. There is a library of nearly 490,000 volumes. In 1916 Cornell made a unique advance in democratic progress by admitting members of the faculty to the board of trustees.

Ezra Cornell (1807–1874), founder of the institution, was born in New York state. He had very little education and began his career as a mechanic. His first work was in connection with the construction of telegraph lines, and the system of stringing wires on poles originated from his suggestion. After this he began to organize telegraph companies and gave much of his time to the construction of lines, as a result of which he amassed a large fortune.

COR'NET, a wind instrument of brass, with a cup-shaped mouthpiece, resembling the bugle in construction, but differing from it in the possession of three keys, or pistons, which can be pressed down by the fingers, giving a wide range of tones. It has a very agreeable tone and carries the air in every band and orchestral composition.

CORNFLOWER, a flowering plant of the composite family, also called *bachelor's button* and *kaiser-blume.* It is a weed in Central Europe, where it grows profusely, but is a popular garden plant in America. The flowers are borne on slender, branching stems, which grow from a foot to two and one-half feet high. The flowers are made up of rows of tubular florets, the outer ones being the larger and more showy. In color they are typically a beautiful blue, but they appear in various other shades.

CORNING, N. Y., the county seat of Steuben County, eighteen miles northwest of Elmira, on the Chemung River and on the New York Central and the Delaware & Lackawanna railroads. The city manufactures glass, terra cotta goods, brick, lumber, railroad supplies and pneumatic tools. The important buildings include the city hall and Corning Free Academy. Corning was incorporated as a village in 1849 and became a city in 1890. Population, 1910, 13,730; in 1917, 15,675 (Federal estimate).

CORN LAWS, a name commonly given to certain statutes passed by the Parliament of Great Britain to regulate trade in grains. The name *corn* in England refers to any grain, not especially to maize, or Indian corn, as in America.

The first form of interference by legislative enactment with the trade in England, beginning soon after the Norman conquest, was the prohibition of exportation, an expedient used in those times to prevent scarcity in a sudden emergency. The policy was continued, with slight changes, till the time of Charles II, when import duties, upon a slid-

ing scale, were for the first time introduced. These remained in force till 1846, when Sir Robert Peel, influenced by a popular agitation, and more especially by the Anti-Corn-Law League, headed by Cobden and Bright, carried a measure repealing the duty on imported grain, except a nominal sum of one shilling per quarter. This also in 1869 was done away with, thus leaving the importation entirely free.

CORNS, small growths of the skin caused by pressure or friction. They are found most frequently on the toes, and in this case are the result of wearing shoes that are too tight. There are two kinds that are very common—fibrous, cone-shaped corns and soft corns. The former occur on top of the toes. They are pressed downward by the shoe into the flesh and are very painful unless the top growth is kept pared off. Soft corns generally appear between the toes, a position that renders them very annoying. If neglected they may give rise to painful ulcerations. Wearing loose shoes with insoles of cork is recommended as a relief for corns. A well-known physician has said that to cure corns one must begin back in childhood, a process attainable only in theory. The lesson for parents is to have their children wear loose, properly-fitting shoes, as well established corns are rarely curable. A standard remedy for removing the hard part of a corn is a solution of salicylic acid and collodion. Bad cases should have the attention of a reliable chiropodist.

CORNUCOPIA, *kawr nu ko′ pi a,* a wreathed horn filled to overflowing with fruit, flowers and grain, used as the symbol of plenty. In art it is frequently represented as held by the Goddess of Plenty or some other symbolic figure. The horn of plenty is a familiar design in both heraldry and architecture.

CORN′WALL, Ontario, the county town of Stormont County on the Saint Lawrence River, fifty-six miles southeast of Ottawa and sixty-eight miles southwest of Montreal. The Saint Lawrence at this point passes through the Long Sault Rapids, which steamers avoid by using the Cornwall canal, eleven miles long. The town is also on the Grand Trunk and the Ottawa & New York railways. Cornwall has abundant electric and water power for its manufacturing industries, of which the chief products are furniture, cotton goods, pulp, paper and lacrosse supplies. Its lacrosse team is one of the most famous in the Dominion. Population, 1911, 6,598; in 1917, with suburbs, 9,000.

CORNWALLIS, *korn wol′lis,* Charles, Marquis, of (1738–1806), a British soldier and statesman, whose surrender at Yorktown in 1781 virtually ended the Revolutionary War. On the outbreak of the struggle he sailed for America with his regiment, although he was opposed to the war. He took part in the Battle of Long Island and afterward pursued Washington through New Jersey; but a part of his army was captured at Trenton, and he himself was defeated at Princeton. The victory of the British at Brandywine was due largely to him, and he fought against General Gates at Camden and General Greene at Guilford. Six months later he was besieged in Yorktown and was compelled to surrender, October 19, 1781. In 1786 Lord Cornwallis went to India as commander in chief and Governor-General, invaded Mysore in 1791 and obliged Tippu Sahib to surrender much territory. On his return to England he was created a marquis and appointed lord-lieutenant of Ireland, and again in 1805 he became Governor-General of India.

LORD CORNWALLIS

COROL′LA, in a typical flower the inner of the two sets of floral leaves. It is the part made up of the petals, and is the part that is usually beautifully colored. See Flowers.

CORONA, *ko ro′ na,* a term used in astronomy, botany and architecture. It all of its uses it shows its derivation, for it comes from the Latin for *crown.* In astronomy a corona is a crown of light encircling the sun, which is visible briefly during total eclipses. In botany the term refers to an appendage between the corolla and stamens of flowers like the narcissus. In architecture the corona is the upper projecting portion of a cornice.

CORONADO, *ko ro nah′ doh,* Francisco Vasquez (about 1500–1549), a Spanish ex-

plorer whose name is connected with the search for fabled golden cities. In 1535 Coronado journeyed to Mexico, where he became a high official by marrying the daughter of the royal treasurer of New Spain. He arrived there in time to hear wonderful tales of seven rich cities reputed to have been discovered by a Spanish monk, and in 1540 he led a band of Spaniards and native Indians in search of these stores of wealth. The expedition discovered the Grand Canyon of the Colorado and went as far north as the boundary between Nebraska and Kansas, returning to Mexico in 1542.

COR'ONER, one of the most important civil officers in a county. It is his duty to investigate the cause of deaths when the cause is not attested by physicians or when death occurs under suspicious circumstances. When death results from a fire he may investigate any suspicious circumstances connected with the origin of the fire. He is assisted in his investigations by a *coroner's jury* of six men, who decide whether persons suspected of wrong-doing in connection with deaths shall be held for grand jury investigation or for trial. In most states the coroner acts as sheriff when there is a vacancy in that office.

COR'ONET, a special form of crown, which princes and nobles wear on ceremonial occasions. In England the rules concerning coronets are rigidly observed. That of the Prince of Wales has a single instead of a double arch, differing in this one particular from the royal crown; a ducal coronet bears on its rim eight strawberry leaves, and that of a marquis four strawberry leaves and four silver balls. There are other forms for an earl, viscount and baron. The coronet is used as a symbol of nobility in the following lines from Tennyson:

> Kind hearts are more than coronets,
> And simple faith than Norman blood.

COROT, *ko ro'*, JEAN BAPTISTE CAMILE (1796–1875), a French artist, one of the most famous of the Barbizon school (see BARBIZON PAINTERS). Corot painted large sacred pictures, such as the *Flight into Egypt* and the *Baptism of Christ*; but his most characteristic and successful work was in landscape. His woodland scenes, painted for the most part at dawn or twilight, in a scheme of pale greens and silvery grays, show a singularly subtle feeling for this phase of nature, and are undoubtedly among the most important contributions of the century to landscape art. Among his works are *Dance of the Nymphs*, *View of Narni* and *Bath of Diana*. There are excellent examples of his work in the Metropolitan Museum and in the Chicago Art Institute.

CORPORAL, *kawr' po ral*, the lowest noncommissioned officer in an army, ranking below the sergeant. He is in charge of a squad comprising seven men, and his duties consist largely in placing and relieving sentinels and in leading his squad in assigned details. He is appointed by the higher command in his company.

CORPORAL PUNISHMENT, the infliction of bodily pain as a mode of punishment. The term is used most commonly with reference to the discipline of children. (The reader will find a discussion of corporal punishment in regard to home training in the article CHILD TRAINING.) For many centuries the belief that the rod has an indispensable place in the school was firmly held, but since the middle of the nineteenth century the evils of corporal punishment have been generally recognized, and to-day in large cities whipping in the schools has been practically abolished, though it still prevails in some rural sections. In many states and provinces corporal punishment in schools is forbidden by law. The modern theory is that whipping tends to antagonize the child and to rouse his lower instincts, and that no real reformation can result when fear alone is stimulated. Furthermore, it is felt that a child should be whipped only by its parents, if at all, and that the liberty to punish by inflicting pain may lead to serious results when administered by an unscrupulous or quick-tempered teacher.

CORPORA'TION, a company of persons organized under forms prescribed by law to conduct a business enterprise. The law treats it as a single individual, which it really is. The owners are called *shareholders*, or *stockholders*, by virtue of investment of money in the enterprise, but they have no part in the actual management of the business except such influence as they can wield when they meet annually to elect men from their membership to direct its affairs. These men so chosen are called *directors*, and from their number the *officers* to conduct the day-by-day operations are chosen.

A corporation may own land, but the individual members of the corporation have no

rights therein. A corporation may owe money, but the members as individuals are under no obligation to pay the debt. If, however, an individual has not paid up his stock in full, he is liable for the amount unpaid. The corporation is not dissolved by the death or withdrawal of members, or the substitution of other members; stock, or shares, merely pass from one ownership to another. This capacity of perpetual succession is regarded as the distinguishing feature of corporations, as compared with other societies.

A corporation is formed by legislative act, more and more generally in accordance with standard laws, providing a certain set of steps for incorporation.

Classes of Corporations. Corporations are divided into two main classes, public and private. *Public* corporations are those created for government purposes, such as corporations of states, counties, cities, villages, or incorporated official boards of officers, as a park board. Of *private* corporations, there are four classes:

1. Corporations for the pecuniary profit of individual members. The basis is a capital fund engaged in commercial enterprise. Shares of stock are held by stockholders. Such corporations are regulated in the United States by statutes, which designate the relations and privileges of the corporation. Such corporations are organized and chartered for specific purposes and cannot transact business other than that for which they are organized. Examples are railroads, telegraph and telephone companies, insurance and banking corporations. The profits are divided pro rata among the stockholders.

2. A corporation not organized for profit. In such a corporation there is no stock and no capital. Examples are social, artistic, scientific, religious and professional societies.

3. Corporations for mutual aid and relief. The first object is the element of personal membership and benefit; the division of profit is a secondary consideration. Examples are building and loan associations, coöperative societies and lodges of various kinds. Such corporations are generally under state control.

4. Incorporated trusts. Such corporations have a fund set apart for some special purpose, held usually by a board of trustees. Examples are colleges, hospitals and charitable associations.

Why Corporations Exist. Partnerships are formed that two or more men may combine their capital and services in a small business; corporations are partnerships on a large scale. There may be hundreds of partners in a corporation, or even thousands; they are not known as partners, but as *stockholders*. Great enterprises are possible because many people join in providing very large capital. More safeguards must be thrown around investors in incorporations than in partnerships, because individual members cannot participate in the handling of its affairs. A corporation is beneficial if it does not grow so strong and powerful that it is able to control the commodity in which it deals; if it becomes monopolistic it may become an evil. This feature of corporations is described in the article TRUSTS.

CORPORATIONS, BUREAU OF. See FEDERAL TRADE COMMISSION.

COR'PUS CHRIS'TI, TEX., the county seat of Nueces County, is situated on Corpus Christi Bay, at the mouth of the Nueces River, 200 miles southwest of Galveston, and on the Texas & Mexican, the San Antonio & Aransas Pass railroads. The city is an important shipping point for fish and other products and has cotton compresses and cottonseed oil mills. The city has a new Federal building. Population, 1910, 8,222; in 1917, 10,789 (Federal estimate).

CORREGGIO, *kor red'jo* (1494–1534), the popular name of ANTONIO ALLEGRI, a famous Italian painter, born at Correggio, near Modena. Correggio is unrivaled in his handling of light and shade, in the grace and rounding of his figures and in the beauty of their expression. Among his best pictures are *Night, Saint Jerome, Marriage of Saint Catharine,* the *Penitent Magdalene,* the altar pieces of *Saint Francis, Saint George, Saint Sebastian,* and several madonnas. See PAINTING.

CORRELA'TION, in pedagogy, the natural relation which different subjects of learning bear to one another. The principle of correlation was recognized by Pestalozzi, Froebel and Herbart, each of whom regarded it as an important law in education. For a time correlation was greatly neglected by educators, but it has recently been recognized again and given a prominent place in all systems of primary and secondary instruction. Correlation considers the relation of each subject to other subjects; as the relation of geography to nature study, history to geography, etc.

CORRESPONDENCE SCHOOLS. See SCHOOLS, CORRESPONDENCE.

CORROSIVE SUBLIMATE, *ko ro'siv sub'li mate,* or bichloride of mercury, is a

white crytalline solid, a burning poison of great strength and a powerful antiseptic. It is a compound of chlorine and mercury, is soluble in water, and is used to disinfect wounds. Taxidermists also find it useful to protect skins from insect attacks. For remedies in case of poisoning from this chemical, see ANTIDOTE.

CORRUPT PRACTICE ACTS, laws designed to deal with offenses committed in connection with elections to public office. These acts provide for punishment for bribery, treating to intoxicating liquors, exercising improper influence over voters, impersonation of legal voters, swearing to false election returns, swearing falsely to amounts expended to secure election, etc.

CORSET, *kor'set,* an undergarment worn by women to give trimness to the figure and support to the body. It is generally made in two pieces, which fasten together at the front and are laced in the back, or vice versa. Whalebone or steels are used for stiffening purposes, though some corsets are made of elastic or webbing material, without stiffening. The corsets designed for swimming, golfing and other athletic sports are of the latter class.

Corsets are subject to changes of style like other garments, for they follow the fashions in regard to what is considered desirable in woman's figure. For instance, when the "hipless" figure was the vogue, corsets were made with long hips which helped to give a straight-line effect. In general, corsets are much less objectionable from a hygienic standpoint than formerly, because compression of the figure to produce a small-waist effect has long since lost favor, both from an esthetic and from a health basis. Many women have discarded them altogether.

CORSICA, *kawr'si kah,* an island in the Mediterranean Sea, 100 miles south of France, famous as the birthplace of Napoleon. It is a possession of France, and is the fourth in size of the islands of the Mediterranean. Corsica is about 110 miles long and fifty-nine miles wide, and has an area of 3,367 square miles. There are fine forests, containing pine, oak, beech, chestnut and cork trees, and the mountain scenery is splendid. In the plains and numerous valleys the soil is generally fertile, but agriculture is in a backward state. The Corsicans, who number about 300,000, are not a progressive people, and much of their farm work is done by laborers from Italy. The chief exports are wine, brandy, olive oil, chestnuts, fruit and fish. The chief towns, Ajaccio, the capital, and Bastia, are connected by railway.

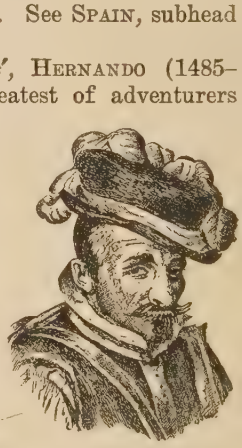
Corsica was first colonized by the Phoenicians, from whom it received the name of Cyrnos. The Romans afterward gave it that of Corsica. From the Romans it passed to the Goths, from them to the Saracens, and in the fifteenth century, to the Genoese, who ceded it to France in 1768. The British gained control of it in 1794, but were obliged to yield it again to France in 1796. Population, 1911, 288,820.

Ajaccio, the capital, is famed as the home of the Bonaparte family. The house in which Napoleon was born is kept as a permanent memorial by the French government. The town is also noted for its coral and sardine fisheries. Population, about 19,000.

CORSICANA, *kor se kah'nah,* TEX., the county seat of Navarro County, 163 miles northeast of Austin, on the Houston & Texas Central, the Saint Louis Southwestern and the Trinity & Brazos Valley railroads. There are many oil wells in the vicinity, and the city is a manufacturing center. It has cottonseed oil mills, brickyards, flour mills, grain elevators and manufactories of cotton presses and cotton gins. The state asylum for orphans is here. Population, 1910, 9,749; in 1917, 10,066 (Federal estimate).

CORTES, *kawr'tes,* the name for the law-making body of Spain. See SPAIN, subhead *Government.*

CORTEZ, *kawr tays',* HERNANDO (1485–1547), one of the greatest of adventurers from Europe to America in the period immediately following the discovery of the New World. Cortez's great exploit was the conquest of Mexico; it was inspired by the characteristic Spanish hope of finding gold and treasure.



HERNANDO CORTEZ

This intrepid man was born at Medellin, Spain. He went to the West Indies in 1504, and in 1518 he set out from Santiago de Cuba with eleven vessels, about 700 Spaniards, eighteen horses and ten small field pieces. He landed on the shore of the Gulf of Mexico, where he caused

his vessels to be burned, in order that his soldiers might have no other resources than their own valor. After meeting stubborn resistance from several tribes near the coast, he was able to go on his way toward the Aztec capital. Montezuma, the great Aztec ruler, received him in a friendly spirit and housed the Spanish leader hospitably. Cortez learned of a conspiracy against him and by trickery secured Montezuma as a hostage. The Aztec king died, and the Spaniards were driven from the city with great loss. It was not until the middle of 1521 that Cortez was able to re-enter the city, for the Aztecs fought stubbornly against him. (See MONTEZUMA; AZTEC.) In 1528 Cortez returned to Spain, but two years later he was again sent out to Mexico, where he remained for ten years.

His remarkable career in America is vividly told in Prescott's Conquest of Mexico.

CORTLAND, N. Y., the county seat of Cortland County, thirty-seven miles south of Syracuse, on the Tioughnioga River and on the Lackawanna and the Lehigh Valley railroads. The manufactures of the city include wire and wire products, carriages and carriage parts, automobile parts, wall paper and other articles. It is the seat of a state normal school. The place was settled in 1792. Population, 1910, 11,504; in 1917, 13,321 (Federal estimate).

CORUNDUM, *ko run'dum*, a compound of aluminum and oxygen, in hardness next to the diamond. There are several varieties, ranging from the transparent colored forms, the amethyst, ruby, sapphire, etc., to a coarse variety known as emery (which see). The colored varieties are found chiefly in Burma, Ceylon and China, and the name is derived from the Hindu word *kurand*. Corundum is four times heavier than water.

COSHOCTON, *ko shok'tun*, OHIO, the county seat of Coshocton County, sixty-nine miles northeast of Columbus, on the unnavigable Muskingum River and on the Wheeling & Lake Erie and the Pennsylvania railroads. The city has machine shops, advertising novelty works and glass and other factories. It was settled in 1811 and was incorporated in 1833. There are a Carnegie Library and two hospitals. Population, 1910, 9,603; in 1917, 11,887 (Federal estimate).

COSMETICS, *koz met'iks*, a general term for a variety of liquids, creams, pastes and powders used to beautify or rejuvenate one's appearance. They include tonics, bleaches and dyes for the hair, massage, cleansing and vanishing creams for the skin, powders and rouge, and preparations for the removal of superfluous hair. Most of the preparations found on the market are harmless, but a good many are fraudulent. Special care should be taken in the selection of dyes for the hair, as many cases of poisoning have resulted from their use. Health specialists maintain that sensible living and cleanliness are preferable to cosmetics as beautifiers, but manufacturers of these preparations continue to prosper.

COSMOS, *koz'mos*, a group of flowering plants found in Mexico, a few species of which have been introduced into the United States. One of the popular forms is bush-like, sometimes reaching a height of ten feet. It blooms in the fall, sometimes as late as November, and bears pink, white or crimson flowers, with yellow centers. Another species, blossoming in late spring in the Southern states, bears flowers of a rich orange-yellow or sulphur color. It grows to a height of four feet or less. These plants thrive in a sandy soil not too rich. They are transplanted into gardens from indoor seed boxes.

COS'SACKS, a class of people who were regarded as a distinct military division of the Russian population under the czars. In 1914 they numbered about 3,000,000. They lived in the southern and eastern portions of European Russia, and held their lands by military tenure, being liable to service for life. Writers are not agreed as to the origin of this people and of their name, but they seemed to differ from the Russians more in their manner of life than in blood and lineage. Originally their government formed a kind of democracy, at the head of which was a chief, or hetman, of their own choice. That democracy gradually disappeared under Russian domination.

In 1570 the principal tribe, the Don Cossacks, built their chief rendezvous, called Tcherkask, on the Don, not far above its mouth. As it was rendered unhealthful by the overflowing of the island on which it stood, New Tcherkask was founded in 1805, some miles from the old city, and to this nearly all the inhabitants removed. In the World War the Cossacks maintained all the traditions of their past, and were known as wonderful horsemen and intrepid fighters. They were nearly all cavalrymen. Though they have long been regarded in other coun-

tries as unintelligent barbarians, they are comparatively well educated and are not at all ferocious. When the Bolsheviks gained control in Russia, in 1917–1918, the Don Cossacks fought the "Red" armies vigorously. Though the Cossacks were driven across the Don into Caucasia, they kept the Bolshevik forces from advancing to the Caspian Sea.

COSTA RICA, *ko'sta re'ka*, the southernmost republic of the Central American states, excepting Panama, which is now classed as a division of Central America and itself a republic. The area is 23,000 square miles, nearly that of West Virginia. The population in 1916 was 441,342. Spanish is the language of the country (see DEMARCATION, LINE OF); the religion is Roman Catholic, but there is absolute liberty in religious matters.

The country is rich in agricultural resources, though traversed by a mountain range which is a link in the system extending through both American continents. There are three climatic regions, due to the mountains. Below 3,000 feet elevation is a hot zone; from 3,000 feet to 7,000 feet is a temperate climate, and above 7,000 feet is a decidedly cool region. On the whole, Costa Rica is healthful. The agricultural products, in order of importance, are coffee, bananas, corn, sugar cane, rice, potatoes and tobacco. Gold and silver are mined in constantly increasing quantities. The distilling of liquor has been for years a government monopoly.

There are 3,300 factories, consuming the products of the country; 15,000 miles of railroad, 147 telegraph offices and 208 post-offices (in 1917). There is an active army of about 40,000 men.

The President of the republic is elected for six years. The law-making power is vested in the Constitutional Congress, of one house, containing forty-three Deputies. The capital city is San José (which see).

Costa Rica was discovered by Columbus in 1502, and was first colonized in 1532 by the Spaniards. Until 1821 it was a part of Guatemala, then belonged to Mexico until 1848, when it became independent, with a republican form of government. In the World War the country severed diplomatic relations with Germany, but did not declare war, contenting itself with giving the allied governments its moral support.

COSTUME. See DRESS.

COTES, SARA JEANNETTE (1862–), a Canadian author, born in Brantford, Ontario, and educated at the Collegiate Institute there. Her maiden name was SARA JEANNETTE DUNCAN. She began her career as a school teacher, but gave that up for journalism. Her first series of letters were descriptive of the Cotton Centennial Exposition, New Orleans. Afterwards she became a member of the editorial staff of the Washington *Post*, and later returned to the Toronto *Globe*, where she wrote under the pen name of "Garth Grafton." She made a tour of the world, writing letters for a syndicate of American and Canadian newspapers. Some of her best known works are *A Social Departure, How Orthodocia and I Went Round the World by Ourselves, The American Girl in London, A Daughter of To-day, Vernon's Aunt, The Simple Adventure of Mem Sahib, The Story of Sonny Sahib, His Honor and a Lady, Those Delightful Americans, The Pool in the Desert, The Imperialist, Burnt Offerings, The Consort* and *Cinderella of Canada.*

COTOPAXI, *ko toh pak'se*, the most remarkable volcanic mountain of the Andes, in Ecuador, about sixty miles northeast of Mount Chimborazo. Its altitude has been estimated at 19,613 feet. It is the most beautiful of the great summits of the Andes, and is almost a perfect cone in shape. Several eruptions have occurred.

COTTON, a plant of the mallow family, whose fibers provide the civilized world with a large portion of its clothing, and whose products are utilized in countless ways for the comfort and happiness of mankind. Cotton would seem to have been especially created by Mother Nature for the welfare of the human race, and a world without it would lack the commonest necessities of life. This fact has been stated in a series of familiar pictures by Frank G. Carpenter, in his interesting volume *How the World Is Clothed:*

"There is no other plant that comes so close to civilized man, and none which we use so

COTTON

1, Shipping Cotton.
2, Blossom.
3, Calico.
4, Cotton Plant.
5, Cotton Oil.
6, Cotton Fiber.
7, Boll open.
8, Cottonseed Meal.
9, Cottolene.
10, Spinning Frame.
11, Loom.
12, Gin and Press.
13, Cotton Field.

much every day of our lives. We go to sleep between cotton sheets, resting our heads on feathers inclosed in cotton pillow slips. We step out in the morning upon a cotton rug, pull cotton stockings over our feet, and dress our bodies in garments made largely of cotton. If, in our hurry, we burst off a button, we sew it on with cotton thread; and then, having put on our shoes, tie them tight with cotton strings. We may wash our faces with soap made from the oil of the cottonseed, and dry them with a cotton towel. And so it goes on throughout the day. We have cotton before us in one shape or another almost every hour until, when tired out, we seek our rest; and then it is this cool white fiber that soothes our fatigue and gives us pleasant dreams."

Not only is man dependent on the plant for much of his comfort and happiness, but he finds that cotton is absolutely indispensable to him when he goes to war. The fate of every army in the World War was bound up in the cotton supply. Guncotton (which see), one of the most important explosives, is made from cotton wool, and numerous chemicals are produced from cotton pulp. Thousands of tons of cotton are used in the manufacture of rubber tires, tubing, percussion shields, etc., and miles of fiber go into the making of bandages, stretchers and hospital bedding. Cotton forms an indispensable part of the equipment of armies and navies, and even the waste is used in cleaning firearms and big guns. See COTTONSEED PRODUCTS.

Distribution and Varieties. The cotton plant originally grew in the tropics, but cultivation has extended its range to about the thirty-fifth parallel on each side of the equator, with the most productive regions lying between 20° and 35° north latitude. In this section are produced the cotton crops of the United States, Northern India and Egypt, and these three countries together produce about nine-tenths of the world's supply.

Of the several varieties cultivated for the market four stand out prominently. They are the *sea-island,* the *Egyptian,* the *Peruvian* and the *upland.* The first named has the longest, finest and silkiest fibres, with an average length of 1.61 inches. The stalk of this variety reaches a height of twelve feet or more. The plant can be grown only upon low lands, and takes its name from the fact that it was first raised on islands off the coast of South Carolina, Florida and Georgia. Egyptian cotton, which is a variety of sea-island, is imported into the United States in considerable quantities, as it is especially suited to the manufacture of goods requiring a smooth finish and is less expensive than sea-island cotton. Peruvian cotton, also imported into the United States, possesses a rough, strong fiber, something like that of wool. It is well adapted to mixing with wool and is used in the manufacture of underwear and hosiery.

Upland cotton is the most widely used and the most abundant of all varieties. Its fibers are on the average slightly less than an inch in length, and the stalk reaches a height of from two to four feet. Because it is the most important variety cultivated in Southern United States, from which comes the bulk of the world's supply, it is described in some detail in the following paragraphs.

Cultivation and Harvesting. The cotton belt extends from Texas to North Carolina. After the land is well plowed, the usual method is to bed up the ground in rows from three to four feet wide. The seed is dropped in the center of these rows, five or six seeds at a time, either in narrow furrows or in holes about a foot apart. As more than one plant every twelve inches is not considered advisable, the plants are thinned out after two week's growth. Planting commences about March 1 in Southern Texas and continues to the end of May in the Piedmont region of North Carolina and other sections as far north.

Soon after the plants are above ground they put forth green leaves and peculiarly-shaped buds called *squares,* which blossom into delicate white flowers when the stalks are a foot or so in height. The sunlight soon turns the white of the blossoms to pink, and about the third day the flowers fall to the ground. They are succeeded on the stalks by tiny green bolls, the parts containing the cotton fiber. Bolls are susceptible to the attacks of the malignant boll weevil (which see), whose ravages cause great loss every year.

After six or eight weeks the ripened bolls burst open and are ready for picking. Since only a portion ripen at the same time, there must be several picking times for the field. Formerly the picking was all done by hand labor, but successful cotton-picking machines have been invented and are in use in large fields. They save considerable expense in harvesting the crop. When the cotton is picked it is sent to the gin house, where it

is ginned, or separated from the seeds. The fiber is then placed in presses and pressed into bales of 500 pounds each. These are bound with iron hoops, when they are ready for shipment.

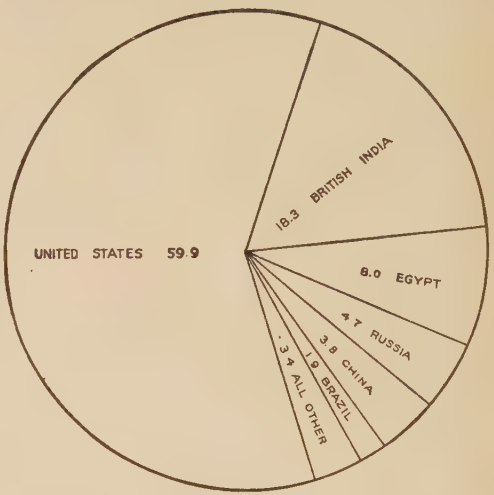
Cotton Products. The most important of these are suggested in the opening paragraphs, and the processes by which the fiber is converted into cloth are described in the articles SPINNING and WEAVING. In addition there are numerous products derived from the seeds (see COTTONSEED PRODUCTS).

Cotton Statistics. The annual crop for the United States ranges between 10,000,000 and 13,000,000 bales of 500 pounds each, the crop for 1917 being 11,248,242 bales. This was a falling off from the totals of several previous years, because Southern farmers have begun to engage in diversified farming. The cotton acreage is in the neighborhood of 32,000,000, and reckoning a crop of 10,650,000 bales from 32,000,000 acres, we find that it takes about three acres to produce one bale. The leading states, in average years in order of output are Texas, Georgia, Alabama, South Carolina, Arkansas, Oklahoma, Mississippi, North Carolina, Louisiana and Tennessee. Texas alone produces a larger crop than British India, which is second to the United States, with an average output of 3,615,000 bales. The relative

WHERE "COTTON IS KING"
Annual production is given in thousands of bales.

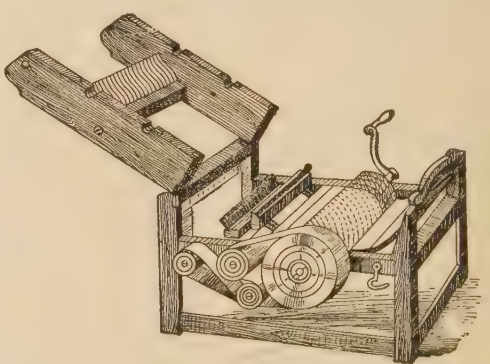
importance of cotton countries and states is shown in the accompanying diagram. There are about 150,000,000 cotton-consuming spindles in the world, of which about 33,400,000 are in America. About three-fifths of these are in the Northern states, Massachusettes ranking first in the manufacture of cotton.

History. Cotton has been used since about the eighth century B. C. It was known to the Egyptians, the Greeks and the Romans, and its cultivation was introduced into Europe by the Mohammedans during the Middle Ages. The European cotton is probably a native of India, but the plant is also native



PROPORTION OF WORLD'S SUPPLY OF COTTON CONTRIBUTED BY EACH COUNTRY

to America. When the American continents were discovered the inhabitants of Mexico and Peru had attained a good degree of skill in raising cotton and manufacturing it into cloth. The planting of cotton began in the Southern states soon after the settlement of the older colonies, but the expense of separating the fiber from the seed was so great that cotton was not a profitable crop. In the latter part of the seventeenth century the



FIRST COTTON GIN

invention of the power loom and the mule jenny for spinning so increased the facilities for manufacturing cotton goods that enough cotton could not be raised to supply the demands of English manufacturers. In 1793 the cotton gin was invented by Eli Whitney

Outline on Cotton

I. Varieties
  (1) Long fiber or sea island cotton
  (2) Short fiber or upland cotton
II. Where Raised
  (1) United States
    (a) Sections
  (2) Foreign Countries
    (b) Names
III. Planting
  (1) Methods
  (2) Season
IV. Cultivation
  (1) Soil
  (2) Dry season, to mature
  (3) Temperature
V. Harvesting
  (1) Time
  (2) How picked.
  (3) Sent to gin house
VI. Seaports, Raw Material
  (1) United States
  (2) Foreign
VII. Factories
  (1) United States
  (2) Foreign Countries
VIII. Products
  (1) Cloth
  (2) Cottolene
  (3) Fodder and Fertilizer
IX. History and Growth of Cotton Industry

Questions on Cotton

When and how are cotton seeds sown? How is cotton cultivated?

How long after the flowering has commenced do the seeds open?

How is cotton harvested? How is it separated from the seeds?

How did the invention of the cotton gin affect the production of cotton? Who invented it?

What is the weight of a bale of cotton?

Which is the oldest cotton-growing country? Who introduced cotton into Europe?

Name the chief cotton-producing countries.

Where and when was cotton first planted in the United States?

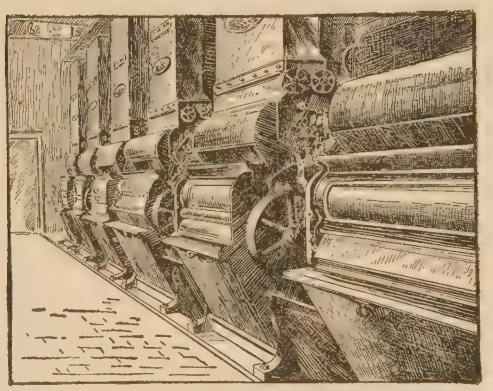
(see Cotton Gin; Whitney, Eli). This machine enabled one man to do more in separating the cotton from its seeds than a hundred men could accomplish by hand labor, and it revolutionized the cotton industry. The first exportation of cotton, consisting of eight bags, weighing 1,200 pounds, was from Virginia in 1784. In 1791 the United States furnished less than one-sixth of one per cent of the cotton importation of Great Britain; a century later its crop was sixty per cent of the world's supply. The increase was from 8,889 bales weighing two hundred twenty-five pounds each to 9,534,700 bales weighing 500 pounds each.

When Alexander Hamilton wrote his great "Report on Manufactures," in 1791, he referred to certain branches of the textile industry as already established; yet at that time there was but one cotton factory where spinning was carried on by water power, and that factory had been established less than a year and had only seventy-two spindles. Although some progress was made during the next twenty years, it was not until the War of 1812 cut off foreign supplies that the cotton manufacture was truly "established." During every decade, not even excepting that which included the Civil War, there has been an increase in the number of employes and in the quantity and value of the goods manufactured. The census of 1850 showed a total value of products of $61,869,000. In 1860 the value had risen to $115,681,000; in 1870 to $177,489,000, but a large part of the increase was due to the inflation of the currency. In 1890 the value was $267,981,000, in 1900, $339,200,000, and in 1910, $630,615,000, ten times the product of 1850, when it was already the leading manufacture in the United States. It was the first, the largest, and the most typical factory industry in the country, and it still holds its position almost undisputed.

COTTON, John (1585–1652), a Puritan clergyman and scholar, born at Derby, England. He was tutor at Cambridge, had a charge in Lincolnshire about 1612, and when summoned to appear before Laud in 1633 because of his Puritan views, he fled to Boston, New England, and preached there till his death. Cotton was the author of a catechism, forms of prayer and other works, and in a controversy with Roger Williams he defended the right of civil authority to interfere in religious matters.

COTTON-BOLL WEEVIL. See Boll Weevil.

COTTON GIN, a machine for separating cotton fiber from its seeds. The name is a corruption of *cotton engine.* The cotton gin was invented by Eli Whitney in 1793, and because it made the cotton industry vastly more profitable and greatly extended it, it was directly responsible for the growth of negro slavery in America. The original machine consisted of a wooden cylinder, into which were fastened strong wire hooks resembling the teeth of a saw. The points of these hooks passed between vertical wires held by a frame, and as the cylinder revolved, the teeth drew the fiber between the wires and let the seed fall to the ground. The cylinder was afterwards replaced by saws operating on the same principle. A modern gin contains seventy saws and will clean 5,000 pounds of cotton in twelve hours. By diligent labor it was possible for one person to separate the seeds from one pound of fiber in a day by hand. See Cotton; Whitney, Eli.



BATTERY OF MODERN COTTON GINS
(For illustration of the first gin, see article Cotton.)

COTTONSEED PRODUCTS. The most important of the products derived from the seed of the cotton plant is a yellow oil. This is extracted by pressure after the seeds have been freed of fibers, bits of lint and hulls. The oil is employed in the manufacture of cottolene, which is used for lard; it is also a substitute for olive oil, and has a place in the manufacture of soaps. About 290 pounds of crude oil may be extracted from one ton of cottonseed. The production of the oil is an important industry in Southern United States, the annual output being over 1,400,000,000 pounds.

Over 2,000,000 tons of cottonseed cake and meal are also produced annually in America. A hard, dry cake remains after the oil has been pressed from a mass of seeds, and when ground this cake forms cottonseed meal. It is an excellent stock food, and when mixed with acid phosphate it has value as a fertilizer. The hulls of the seeds are also used as stock food, and the fine pieces of lint (linters), which cling to the seeds in the ginning process, are used in the manufacture of low-priced yarns, upholstering, wadding, etc. Another by-product is sludge, which settles at the bottom of oil tanks. It is used in the manufacture of soap.

COTTONWOOD, a tall, quick-growing tree of the poplar family, so called because the seeds are borne in green balls which are filled with a white, cottony mass. In May these balls burst open, and their fluffy contents are widely scattered. The cottonwood is distributed through the Eastern and Central United States, especially along the banks of streams. In Canada it grows from Quebec to the North West Territories. The bark is gray-brown and rough, the leaves tapering and shiny, and the flowers are borne in catkins that fall in the spring. Cottonwood is not a strong wood, but is useful for making packing cases, barrels, woodenware and pulp. In cities the tree provides delightful shade, and may live to be seventy-five years old, but in exposed places in country districts the brittle wood cannot stand against the winds, and is short-lived.

COTYLEDON, *kot i le'dun,* the immature leaf of a seedling. Those plants which bear one seed-leaf, like grasses and grains, are called *monocotyledons;* those which produce two seed-leaves, like the bean, are *dicotyledons.* These two classes make up the great group of flowering plants. If a bean is soaked, freed from the skin and split, its two cotyledons may readily be seen. After the bean seedling rises above the ground the cotyledons appear as two thick leaves, which gradually wither and fall off. They are followed by true leaves. In the grains the cotyledon does not push out of the seed, but forms an absorbing organ which serves to feed the growing plant germ. The cotyledons of the pea, horse-chestnut and various other dicotyledonous plants of that type also remain inside the seed coat and underground, but those of the squash and pumpkin develop as temporary green leaves above ground.

COUGAR, *koo'gur.* See PUMA.

COUGH, *koff,* a contraction of the muscles which control breathing, caused by irritation of the air passages or by nervousness. While one generally coughs involuntarily, the action may be controlled by proper training. Coughing is a prominent symptom of cold on the chest, bronchitis, tuberculosis, pneumonia and catarrh of the throat. The old remedy was to take a "soothing medicine," which usually contained opium, but physicians today warn against such preparations. In tuberculosis sanitariums fresh air has been found a great aid in alleviating coughs, and the patients there are trained to refrain from coughing except when to cough brings up mucus and clears the air passages. A cough caused by nervous irritation can only be cured by the exercise of will power. The ordinary cold on the chest can often be helped by means of steam inhalation, hot and cold sponging of the chest, and the use of a cold compress. Any serious case of coughing which persists after home treatment should have the attention of a physician.

COUNCIL BLUFFS, IOWA, founded as Kanesville in 1855 by the Mormons and given its present name in 1868, is the county seat of Pottawattamie County. It is four miles from Omaha, across the Missouri River, and is two and one-half miles east of that stream. Seven trunk line railroads enter the city—the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago & North Western, the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific, the Union Pacific and the Wabash. There are large stockyards, grain elevators and flouring mills, and the city is one of the largest agricultural implement centers in the world. The city has a fine Federal building, a large courthouse, a Carnegie Library and the Iowa School for the Deaf. Saint Francis Academy and My Lady of Victory Seminary are here. There are three hospitals.

The town received its name because near its site Lewis and Clark conferred with the Indians in 1804. Population, 1910, 29,292; in 1917, 31,838 (Federal estimate).

COUNT, a title of nobility in some European countries, corresponding to that of earl in Great Britain. Though Britain does not recognize the title, it gives the title *countess* to the wife of an earl.

COUNTERFEITING, *kown' tur fit ing,* fraudulently producing an article in imitation of another, for the purpose of inducing the use of the false article for the genuine. The term is most commonly applied to the imitation of money. The offense is dealt with by national statutes, and it constitutes a crime punishable by fine and imprisonment, the punishment extending to as much as twenty years in prison and a fine of $10,000.

COUNTERPOINT, in music, the adding of other melodies to a given melody or theme. The added melodies are independent of the original theme in movement, but related to it by certain rules. When a single part is added, the result is known as *two-part counterpoint.* When two points are added, the result is *three-part counterpoint.* When the notes of the added parts are of the same value as corresponding notes in the original melody, the composition is known as *simple counterpoint,* and when more than one note of the added part are made equivalent to one note of the original melody the resulting composition is called *florid counterpoint.* The term is sometimes used synonymously with harmony. The name arose from the early system of notation, in which points were used for notes; hence one point was set opposite another point.

COUNTER-REFORMATION. As the Reformation spread, the Roman Catholic Church attempted to counteract its influence by adopting certain measures to check its growth in those countries where it had already gained a hold, to prevent its further spread and to abolish abuses that had grown up in the Church. To these measures has been given the name of Counter-Reformation. The question of the reform of abuses had been receiving much attention in the Church previous to the beginning of the Reformation, but it was not until the Council of Trent (1545–1563) that any effective work was done toward this end. This council formulated a creed and discipline which is practically that of a modern Church, and which did away with the most flagrant abuses. The attempt to check the spread of Protestantism led in Italy and Spain to the Inquisition. In these two countries Protestantism was easily uprooted, because it had never had there more than a feeble existence. In Bohemia it was abolished only by means of the Thirty Years War, and in a number of other countries, particularly in the Netherlands, the attempt to replace it with Catholicism led to serious wars. See REFORMATION.

Outline on the County

I. Map of County
II. Description
  (a) Size
  (b) Number of townships
  (c) Boundaries
  (d) Position in state
  (e) Physical features
    (1) Surface
    (2) Lakes
    (3) Rivers
III. Government
  (a) County officers
    (1) How elected
    (2) Terms of office
    (3) Duties of each
    (4) Salaries
  (b) County buildings
  (c) Taxes
    (1) How levied
    (2) How collected
    (3) How applied
IV. Institutions
  (a) Penal
  (b) Charitable
  (c) Educational
    (1) Public
    (2) Private
V. Industries
  (a) Agriculture
    (1) Leading crops
    (2) Markets
  (b) Manufactures
    (1) Leading articles
    (2) Markets
  (c) Mining
    (1) Leading products
    (2) Markets
  (d) Transportation
    (1) Rail
    (2) Water
VI. County Seat
  (a) How and when located
  (b) Reason for present location
  (c) Rank among county's cities and towns
  (d) Distance from other cities in state
  (e) Industrial life
VII. History
  (a) When settled
  (b) When organized as county
  (c) Famous men produced
  (d) Events which were notable

COUNTERSIGN, a private signal, word or phrase given to soldiers on guard, who are ordered to let no man pass unless he first gives that sign. The term also refers to the signature of a secretary or other official to a document signed by another. Such countersigning is for the purpose of attesting that the document is authentic.

COUNTY, a word of European origin, referring originally to a district governed by a count or earl, but now known as a political division of a state or province. It is composed of from about twelve to twenty or more townships. Each township in most states sends one man, called a supervisor, or commissioner, to a county legislative board called the board of supervisors, and all citizens of each township participate in county government and support it with their taxes. In turn, the county sends representatives to the state legislature, and all people in the county pay taxes for the support of the state government. The town in the county which is the seat of its government is called the county seat.

The outline which appears on this page is suggested as the basis for an essay on the story of any county.

COUNTY AGENT. See Farmers' Institute.

COURLAND, *koor'land*, a territory of European Russia, one of the so-called "Baltic provinces" that set up independent governments in 1917, after the abdication of the czar. When, early in 1918, Russia renounced all claim to the Baltic provinces by the Treaty of Brest-Litovsk, German troops occupied Courland and overthrew the new government. Before the close of the year Germany itself surrendered to the allies, and the German forces thereupon withdrew. Their withdrawal was followed by a Bolshevik invasion, and for months afterward there was vigorous fighting between the Courland regiments and the "Red" army.

The province lies south of the Gulf of Riga and the province of Livonia, east of the Baltic Sea, and west and north of Lithuania. With an area of 10,435 square miles, it is about the size of New Hampshire and Rhode Island combined. Agriculture, cattle raising and fishing are the chief occupations of the people, who numbered 812,300 in 1915. The majority of them are Letts. Mitau is the capital, and Libau is the chief port. See World War; Russia.

COURT, a tribunal established for the administration of justice. Its duty is to try and punish persons accused of committing offenses against the State, the public or individuals, and to settle controversies. Courts have existed from remote times and probably had their origin in the executive power possessed by kings or chiefs, or in the power of pardon belonging to priests and other church dignitaries. The systems of courts differ among different modern nations, but their general powers and constitutions are the same, their acts being in most cases independent of all other authority and their decisions being regarded as final in most cases.

United States Courts. These courts, excepting the Supreme Court, are concerned only with cases arising from the violation of Federal statutes. The lowest is the United States District Court; appeals go to the Circuit Court of Appeals, and under certain conditions may reach the United States Supreme Court. In addition to this system involving the three courts with which the public is most familiar, there are other Federal courts, each having special jurisdiction. The following table presents the facts with respect to all of them:

TITLE	ORGANIZATION	JURISDICTION*
Supreme Court.	A chief justice, $15,000; eight associates, $14,500.	This court has original jurisdiction in all cases relating to ambassadors and other public ministers and consuls, and in those to which a state is a party. It has appellate jurisdiction in all cases originating in the inferior courts, save such as Congress by law shall except. Appeals may be made to it, and writs of error lie to it, from the district courts, from the courts of appeals, and from the supreme courts of the District of Columbia and the territories.
Circuit Courts of Appeals.	Nine circuits, to each of which are assigned one Justice of the Supreme Court and from two to five circuit judges; thirty-two circuit judges in all; salary, $7,000.	Appeals from district and territorial courts.
District Courts.	One hundred and three districts, including Alaska, Hawaii and Porto Rico, each with a district judge; salary, $6,000.	Criminal prosecutions for violation of Federal laws, and cases connected with revenue and postal laws, bankruptcy and admiralty matters. In a general way district courts have jurisdiction in all cases assigned by the Constitution (Article III) to the Federal judiciary, except those cases in which original jurisdiction is imposed on the Supreme Court.
Court of Claims.	A chief justice, $6,500, and four associates, $6,000.	Over money claims of individuals against the government.
Court of Private Land Claims.	A chief justice, $5,000, and four associates, $5,000.	Decides conflicting claims of title to certain public lands.
Court of Appeals District of Columbia.	A chief justice, $6,500, and two associates, $6,000.	Hears appeals from the supreme court of the District of Columbia.
Supreme Ct. District of Columbia.	A chief justice, $5,000; four associates, $5,000.	Resembles in jurisdiction other United States district courts.
Territorial Courts.	Judges appointed for four years.	Resembles United States district courts.
Admiralty.	Courts, Commissioners' Courts, and Courts-martial.	

*The supreme court has both original and appellate jurisdiction; the circuit courts of appeals, and the court of appeals for the District of Columbia, have only appellate jurisdiction; the other courts only original jurisdiction.

State Courts. The courts of the state differ in powers and jurisdiction in the various states. At the foot of the whole system are the *justices of the peace,* who try petty criminal and civil suits. In some states there are *county courts,* which hear appeals from justices and have original jurisdiction in some cases. Next come *circuit courts,* each of which has jurisdiction over several counties and hears appeals from the lower courts. Over all is the *supreme court* of the state, usually a court of appeal only, but occasional-

ly having original jurisdiction. In some states there are slight variations of this system. Cases may be carried from the supreme court of the state to the Supreme Court of the United States, usually in questions involving the interpretation of the United States Constitution.

Courts in Canada. As in the United States, there are two classes of courts, Dominion and local. In the former class there are two courts, the Supreme Court of the Dominion and the Exchequer Court, the members of each being appointed by the Governor-General in Council. The provincial court judges, except justices of the peace and city magistrates, are also paid by the Dominion government, but the judges in each province receive appointment from the lieutenant-governor in council. The jurisdiction of each court is similar to that of courts of like grade in the United States.

Related Articles. Consult the following titles for additional information:

Admiralty Court of Canada	Justice of the Peace
Court of Claims	Juvenile Court
Exchequer Court of Canada	Law (with list)
Judge	Morals Court
Judicial Department of Canada	Probate Court
Jury and Trial by Jury	Procedure
Justice, Department of	Supreme Court of Canada
	Supreme Court of the United States

COURT FOOL, a name given to the professional jesters who were common at courts during ancient and medieval times. Such persons were known in the time of Philip of Macedon, but they formed a more important part of court life during the Middle Ages than at any other time. The fool dressed in gay colors, with a cap ornamented with bells and surmounted with ass's ears, carried a scepter, usually ornamented with bells, and wore a large collar. The Stuart kings were the last English kings to have court jesters, but at the Russian court such personages existed to the nineteenth century, and Marie Antoinette of France had a jester just before the Revolution. Shakespeare in several of his plays, as *King Lear, As You Like It* and *Twelfth Night,* introduces the court fool.

COURT-MARTIAL, *kort mahr'shal,* a court consisting of military or naval officers, for the trial of military or naval offenses. In the army of the United States there are general courts-martial, before which only officers can be tried, and regimental and garrison courts-martial. In the navy summary courts-martial are held for the trial of petty officers and persons of inferior rating, and general courts-martial for the trial of the higher officers.

COURT OF CLAIMS. Under the American system no citizen can bring suit against the Federal government. To provide an avenue through which justice may be secured Congress established the United States Court of Claims in 1855. Five justices sit in this court, one of whom is designated chief justice; they are appointed by the President for life, or during good behavior. The salary of the chief justice is $6,500; of the justices, $6,000.

Claims allowed by the court are paid out of Congressional appropriations, always maintained for the purpose. If the amount at issue exceeds $3,000 an appeal from an adverse decision may be made to the United States Supreme Court.

COURT-PLASTER, black, flesh-colored or transparent silk, varnished over with a solution of glycerine and isinglass and often perfumed with benzoin. It is now used for covering slight wounds, but it is said to have received its name from the fact that at one time the ladies of the court wore it on their faces in patches, to make their complexions appear more brilliant.

COURTSHIP OF MILES STANDISH, a popular poem, written by Henry W. Longfellow and published in 1858. It is a story of Plymouth colony, and is based on a tradition that seems to have a foundation of truth. The chief characters are Captain Miles Standish, John Alden and Priscilla Mullens. The last named was a beautiful girl whose charm won the heart of the sturdy Captain, a widower since the first winter of the struggling colony. Captain Standish was brave when it came to fighting Indians, but timid in the matter of proposing, and he requested his staunch friend John Alden to plead his suit for him. It so happened that John loved Priscilla himself, and Priscilla knew it, and when he tried to plead for the Captain the maid replied, "Why don't you speak for yourself, John?" In the poem the two were married with the blessing of the Captain, but the prose version of the story, which gave Longfellow the basis for his poem, states that Standish never forgave his friend. Longfellow himself was a descendant of the Aldens, and a house built in 1653 by John Alden is still in the possession of a member of the family.

COVENANTERS, *kuv'e nan turz*, a term applied to those people in Scotland who bound themselves by a series of covenants to maintain Presbyterianism in the country. See COVENANTS.

COVENANTS, *kuv'e nants*, a term used in the Bible in several indefinite senses, sometimes with the meaning of *promise*, sometimes in place of *agreement*. Covenants between man and man are frequently mentioned, but special emphasis is laid upon those between God and the Israelitish nation, given through Noah, Abraham and others. This was a pledge of God's blessing upon the Israelites in return for their faith and devotion.

The term was used by the Scottish people to denote associations or bands of persons joined together for mutual support and assistance, either in the maintenance of a principle or in resistance to oppression. Two of these covenants were especially noted, namely, the *National Covenant* of 1638 and the *Solemn League and Covenant* of 1643. The first had for its object the maintenance of the Presbyterian or Reformed religion and grew out of the fear in Scotland that Charles I would introduce the English *Book of Common Prayer* and increase the power of the Scottish bishops. The *Solemn League and Covenant* was a contract entered into between the General Assembly of the Church of Scotland and commissioners in the English Parliament, according to which Scotland was to furnish an army to help the English against Charles I, upon the condition that Presbyterianism be made the established religion in England, Scotland and Ireland. Both covenants were abrogated after the restoration of the Stuarts in 1660, and their adherents were severely criticised and regained freedom of worship only after the revolution of 1688.

COVENTRY, *kuv'ent ry*, ENGLAND, a city in the county of Warwickshire, eighty-five miles northwest of London. It is also the Parliamentary and municipal borough for the county. Coventry is a place of great antiquity. In 1043 Earl Leofric and his wife, Lady Godiva (see GODIVA, LADY), founded here a Benedictine monastery, and many religious mysteries and pageants were acted before the king in the fifteenth century. Henry VIII destroyed this abbey and the ancient walls which surrounded the city. To-day there are several fine churches, Saint Michael's being the largest parish church in England. Coventry is a prosperous manufacturing city, and owing to its rapid industrial growth the boundaries have been extended. Its chief manufactures are bicycles, automobiles, ribbons, watches, sewing machines and munitions. Population, 1914, estimated, 115,489.

COVERDALE, *kuv'ur dale*, MILES (1488–1568), the first Englishman to bring out a complete translation of the Bible into printed English. At the beginning of the Reformation he was in an Augustinian monastery at Cambridge, but he soon adopted the doctrines of the Reformation and became their very enthusiastic supporter. In 1535 he published his English translation of the Bible, and the Psalms of his translation are still used in the Book of Common Prayer. In 1550 Coverdale was made bishop of Exeter. He held this office until 1553, when, on the accession of Mary, he was thrown into prison. The next year he was released and obliged to leave England, but after the accession of Elizabeth he returned.

COVINGTON, *kuv'ing ton*, KY., the second largest city of the state, is one of the county seats of Kenton County, at the junction of the Ohio and the Licking rivers, opposite Cincinnati, and on the Louisville & Nashville, the Chesapeake & Ohio and other railroads. The city is connected with Cincinnati by a notable suspension bridge 2,763 feet long. Newport is a close neighbor, on the east. Covington is a residence town for many Cincinnati business men. There are many handsome private dwellings and public buildings, among which are a public library, a fine Federal building, Notre Dame Academy and a beautiful cathedral. There are extensive manufacturing industries, including distilleries, cotton and woolen mills, packing establishments and glass factories. The city was settled in 1812 and was chartered in 1834. Population, 1910, 53,270; in 1917, 59,623 (Federal estimate).

COW'BIRD, or **COW BUNTING**, so called because usually found near cattle, is an American bird of the starling family, which resembles the European cuckoo in that it lays its eggs in the nests of other birds and leaves them to be hatched by the foster parent. While a single bird lays several eggs, it has never been known to deposit more than one in the same nest. The small birds whose nests are used for this purpose do not usually seem

to notice the difference, and the young cowbird, being larger, secures most of the food intended for the true children. Sometimes, however, the yellow warblers and other small birds recognize the presence of the intruding egg and abandon the nest or seal it over and build another upon the top of the old one, rejecting not only the strange egg but all of their own, as well. From its peculiar habit of making no nest, the cowbird is sometimes called the *lazy bird.* There are usually more males than females in a flock.

COW'ITCH, COW'HAGE, or **COW'AGE,** the hairs of the pods of certain pod-bearing plants which grow in the East and West Indies. The hairs are stiff and brittle, with finely serrated tips, which enables them easily to penetrate the skin, where they produce an intolerable itching.

COW PAR'SNIP, a large, coarse plant of the parsley family, that grows to a height of from three to six feet and bears handsome leaves and large clusters of small white flowers. Though rather striking in appearance, the cow parsnip becomes a troublesome weed if allowed to grow in damp soil near the water. There are a number of different species, but none is especially valuable, though one or two are used for fodder or as a substitute for celery.

COWPEA, a pod-bearing plant widely distributed in temperate and tropical regions, of value as a forage plant and also because it has the power of renewing the soil. This is due to the fact that it gathers free nitrogen from the air, in the manner of clover. The cowpea shows great variation of habit and appearance, and appears in creeping, bushy and tall and erect forms. It is grown extensively in the Southern United States, where it is fed green to stock and also made into hay and ensilage. Cowpea pods are considered an excellent fattening food for young pigs.

COWPENS, Battle of the, a battle of the American Revolution, fought in Spartansburg County, S. C., near King's Mountain, January 17, 1781. The English force of 1,100 under Tarleton was opposed by a thousand Americans under Morgan and other partisan leaders. The British army was attacked on both flanks simultaneously, and the whole force, with the exception of 270, was captured or killed. The Americans lost but twelve killed and sixty-one wounded.

COW'PER, William (1731–1800), an English poet, the author of several beautiful and familiar hymns. He lost his mother when he was but six year old, and was placed at a school in Hertfordshire, from which, on account of rough treatment from one of his schoolmates, he was removed when ten years of age.

He left Westminster School at eighteen and was then apprenticed for three years to a solicitor, and at the expiration of his service he took chambers in the Middle Temple. In 1754 he was called to the bar. The interest of his family procured for him the post of clerk to the House of Lords; but having to appear for examination at the bar of the House, his nervousness was such that on the very day appointed for the examination he resigned the office and even attempted suicide. Soon afterward he became insane, and from December, 1763, to June, 1765, he remained under the care of Doctor Cotton at Saint Albans. The skill and humanity of that gentleman restored him to health, and he went to live in Huntingdon.

Here Cowper became acquainted with Mr. and Mrs. Unwin, in whose house he lived for some time. When Mr. Unwin died, Mrs. Unwin moved with the poet to Olney, where she carefully tended him through a second attack of his malady. In 1776 he commenced a poem on the *Progress of Error,* which he followed by three other poems, *Truth, Table Talk* and *Expostulation.* These, with some others, were published in a volume in 1782. One of his friends, Lady Austen, suggested *The Task,* which on its publication in 1785 made Cowper famous. It had a real effect in helping to bring into poetry a spontaneity and a feeling for natural beauty, in contrast to the artificiality of most of the poetry of the eighteenth century. *The Diverting History of John Gilpin,* by which Cowper is perhaps best known, is also due to the suggestion of Lady Austen. The translation of *Homer,* begun in 1784, occupied him for the next six years, and was published in 1791. He removed during its progress from Olney to Weston. In the beginning of 1794 he was again attacked with insanity. Cowper's *Olney Hymns,* published in 1779, include such well-known songs as *Oh! for a Closer Walk with God, God Moves in a Mysterious Way* and *There is a Fountain Filled with Blood.*

COW'POX, a disease which appears on the teats of the cow, in the form of eruptions. This is the same disease as smallpox in man, and the fluid from cowpox eruptions injected into human beings gives them a mild form

COYOTE

of the disease and protects them from its virulent forms. Milk from diseased cows should never be used as food. See VACCINATION; SMALLPOX.

COW'RIE, or **COWRY**, the shell of a small mollusk, which in some parts of Africa and in many parts of Southern Asia has long been used as money. The practice is yet common among inland tribes. The shells vary in value in different localities. The beauty of these shells has given them a place among ornaments, and both civilized and uncivilized nations have always used them.

COW'SLIP. In England this name is given to the primrose, a pretty little herb found in pastures and meadows. It has a cluster of buff-yellow, scented flowers, in the midst of a rosette of spreading leaves. In the United States the marsh marigold, a large yellow-flowered plant of the buttercup family, is called cowslip. This grows in swampy places, and in early spring its leaves and stems are often gathered for greens. The flowers are a bright yellow. The beautiful plant of the primrose family, known in the Western states as the shooting star, is called the American cowslip, while the Virginian cowslip belongs to the borage family and is known as the bluebell, or lungwort.

COX, PALMER (1840–), an American artist and author, known especially as the creator of the "Brownie" pictures and verses. He was born in Quebec, and lived for some time in California, beginning his literary work with contributions to the *Golden Era* and other Western papers. In 1875 he moved to New York City, where he commenced his work as illustrator and writer for children's magazines and books. His works include *The Brownies, Their Book; The Brownies in Fairyland* and *The Brownies in the Philippines.*

COYOTE, *ki'ote, or ki o'te,* the most disliked of all members of the wolf family, is an animal about forty inches long and eighteen inches high. He is sneaking in his habits, is apparently always hungry, and is a constant menace to small domestic animals and poultry in neighborhoods he infests. Few animals are more fleet-footed.

CRAB, the name given to nearly a thousand species of shellfish. Many of them are classed as a food, but they contain slight nutriment, being really little more than a delicacy. Enough of them are eaten to raise crab fishing to the plane of a profitable industry.

The head and breast are united, and the whole is covered with a strong shell. The mouth has several pairs of strong jaws, in addition to which the stomach has its internal surface studded with hard projections for the purpose of grinding the food. The liver is the soft, rich, yellow substance usually called the *fat* of the crab. The young crabs throw off their covering at intervals as they increase in size, but after they are full-grown, three or four years at least may pass without a change of this character. The first pair of limbs are not used for locomotion, but are furnished with strong claws or pincers, and the right claw is generally larger than the left. The crab's eyes are compound and are placed upon stalks, which sometimes are over an inch in length.

Crabs generally live on decaying animal matter, though some live on vegetable substances, as the *racer crabs* of the West Indies, which suck the juice of the sugar cane. Crabs inhabit both sea water and fresh water; some live on the land, only going to the sea to spawn.

Related Articles. Consult the following titles for additional information:

Crawfish	Hermit Crab
Crustacea	Horseshoe Crab

CRAB APPLE, a tree which bears a small, tart fruit much used in making jellies and preserves. The name is somewhat loosely applied to any apple tree producing a sour, uncultivated fruit, but properly it refers to the wild varieties of the true apple, from

which the latter is produced. The best known crab apple grown in America is the narrow-leaved variety, found from New Jersey to Illinois and Kansas, and south to Louisiana and Florida. Another variety, distributed from Ontario to Michigan and as far south as South Carolina, bears a greenish-yellow fruit of very sweet scent. A very excellent grade of crab apples comes from the Bitter Root Valley in Montana.

CRACOW, or **KRACOW**, *kra'ko* (Polish) or *krah'kou* (German), once the capital of the kingdom of Poland, and later the capital of the Austrian province of Galicia. It is still the center of the intellectual life of the Polish people, and in historic associations no Polish city or town is its rival. Here, in the six-centuries-old Stanislaus Cathedral, the kings were crowned, and here lie buried the nation's heroes—John III Sobieski, Kosciusko, Poniatowski and Mieckiewicz.

Situated on the left bank of the Vistula, which separates it from Russian soil, Cracow is of great strategic importance, both in a commercial and in a military sense. From it spread out the main railway lines running into the heart of Germany and Austria. Its trade, by rail and water, is chiefly in lumber, grain, cattle and salt, the salt mines, eight miles away, being among the largest in Europe. The city's ancient walls have long been torn down, but it is protected by modern fortifications of great strength.

In 1914 the Russians, by capturing Lemberg and Przemysl, for a time threatened the security of Cracow, but in the next year the recapture of these cities by the Austro-German forces made the siege of Cracow a remote possibility. After the dissolution of Austria-Hungary, in 1918, at the close of the World War, the fate of Cracow was uncertain. Galicia was claimed by Poland, which was attempting to reëstablish the kingdom as it existed in the Middle Ages. The boundaries of the Polish state were to be determined by the peace conference. Population of Cracow, 1914, estimated, 171,000. See POLAND; WORLD WAR.

CRAD'DOCK, CHARLES EGBERT. See MURFREE, MARY NOAILLES.

CRAIGIE, *kra'ge*, PEARL RICHARDS (1867–1906), an English novelist and dramatist, who wrote under the pen name of JOHN OLIVER HOBBES. She was educated in England, though born in Boston, Mass. Her style was brilliant and she was especially skilful in her handling of dialogue. Among her books are *The Gods, The Vineyard, Flute of Pan* and *The Dream and the Business*. Her plays include *A Repentance* and *Journeys End in Lovers' Meeting*, the latter written for Ellen Terry.

CRAIK, DINAH MARIA MULOCK (1826–1887), an English novelist, known chiefly for her story *John Halifax, Gentleman*, which has always been very popular and has been widely translated. Among her less generally known novels are *The Ogilvies, Olive, A Life for a Life* and *Mistress and Maid*. She also wrote two popular children's stories, *The Little Lame Prince* and *The Adventure of a Brownie*.

CRAKEBERRY. See CROWBERRY.

CRAN'BERRY, a small, red, acid fruit, first found in Northern Asia and Central Europe, but now domesticated in nearly every temperate zone. Because it grows only on low, swampy land or on peat bogs it is called in some localities *moss berry* or *moor berry*. The berry, when ripe, is globose and is a little more than a quarter of an inch in diameter. The American cranberry has larger berries than the European species and is extensively cultivated in some localities. New Jersey, Wisconsin and the Cape Cod peninsula furnish the greater part of the million bushels harvested yearly in America.

CRANE, a machine for raising and moving heavy weights. The most common form of crane is the ordinary derrick (see DERRICK). The power may be applied to a crank by hand, or to a train of wheelwork by a steam engine or an electric motor. The hoisting engine is in ordinary use for furnishing power for cranes of this sort, where buildings or other structures are being erected. The weight is hoisted by winding a rope or cable around a cylinder. In shipyards, steel mills, locomotive works and other places where heavy weights have to be moved from one part of the yard or factory to another, the traveling crane is employed. This consists of a hoisting device similar to that used on the ordinary crane, with the exception that no jib is used. This device is mounted on a traveling table, which runs on rails supported on the opposite sides of the building, or on a trestle constructed for the purpose. These cranes are usually operated by electric motors. One motor operates the hoisting

machinery, and another operates the machinery by which the crane is moved over the track. Cranes of this pattern are constructed with sufficient power to lift an entire locomotive and carry it from one part of the factory to another where it is set down as lightly as though it weighed but a few pounds.

CRANE, the common name of a number of different species of wading birds, generally of rather large size and remarkable for their long necks and stilt-like legs, which fit them for living in marshes and lands that are frequently overflowed The food of cranes is partly of vegetable matter, but they also eat insects, worms, frogs, reptiles, small fish and the spawn of various aquatic animals. They nest among the bushes or in the marshes and lay but two eggs. The cranes spend their summers in the north temperate regions, but on the approach of winter they make exceedingly long migrations to the south.

CRANE

They feed chiefly in the early part of the day and spend the rest of the time often dozing, standing on one leg, with the head drawn back on the shoulders. Some species are easily domesticated and are regarded as sacred in parts of Japan and India. Some species carry beautiful crests of long, slender feathers, and most of them are noted for the peculiar dances and antics through which they go during courtships. The *demoiselle crane*, found in Central Asia and in winter in Africa, is especially noted for its graceful performances. In the United States there are three species, the whooping crane being the largest. The windpipe of this crane is coiled at the lower end into the crevices of the breast bone and is sometimes eight feet in length. This accounts for the peculiar resonance of the bird's cry.

CRANE, STEPHEN (1870–1900), an American novelist, born in Newark, N. J. He studied at Lafayette College and Syracuse University and then began newspaper work. While thus engaged, he wrote and published, at his own expense, *Maggie, a Girl of the Streets*, a realistic novel of street and slum life. *The Red Badge of Courage*, which eventually came into wide notice, was written before the author attained his majority. The story deals with a raw recruit in battle, and his first fear on confronting the foe and hearing the whistle of shot and shell are described in a most vivid manner. Crane was able to describe the battle scenes and tactical evolutions in such a way as to deceive the critics, who declared that such descriptions could only have been written by an old veteran. Among his other books are The *Little Regiment, On Active Service* and *Whilomville Stories*.

CRANE, WALTER (1845–1915), an English painter and engraver, born in Liverpool. Among his works are *Birth of Venus, The Fate of Proserpina, Plato's Garden, Date Trees on Monte Pincio* and *End of the Year*. Crane is specially known for his drawings on juvenile subjects, among which are *Echoes from Hellas, Flora's Feast* and *Queen Summer*. He has made designs for glass windows, tapestries and the like, and was the author of *An Artist's Reminiscences*.

CRANIAL NERVES. See NERVES, CRANIAL.

CRAN'MER, THOMAS (1489–1556), Archbishop of Canterbury, famous for the part he played in the English Reformation during the reign of Henry VIII. In January, 1533, he was appointed Archbishop of Canterbury, and zealously promoted the cause of the Reformation; through him the Bible was translated and read in churches, and monastic institutions were vigorously suppressed. Henry VIII appointed him by will one of the Council of Regency to Edward VI. By the will of Edward VI, his sister Mary was excluded from the crown, and Cranmer upheld the cause of Lady Jane Grey. With others who had been most active in Lady Jane's favor, he was sent to the Tower when Mary ascended the throne. He was tried on charge of treason and condemned to die, but was not executed on that sentence. In 1554, with Latimer and Ridley, he was removed to the common jail on the charge of heresy. Cranmer signed sev-

eral recantations, but he finally said he would retract all his hand had written in fear of death. He was burned at the stake, and when the fire was lighted he thrust his hand into it, saying, "This hath offended: Oh, this unworthy hand!"

CRAN'STON, R. I., a town in Providence County, on the New York, New Haven & Hartford railroad. It is a residence place near Providence, of which it was a part until 1754. There are breweries, vegetable gardens and manufactures of cotton goods and wire. The town has four village libraries, state reform schools for boys and girls, a state prison, an almshouse, an insane asylum and a workhouse. Population, 1910, 21,107; in 1917, 26,773 (Federal estimate).

CRAPE, or **CREPE**, a crinkled, wiry, transparent stuff, made of raw silk, well twisted and gummed, and commonly dyed black, to be used for mourning garments. It is manufactured in Italy, England and France. China crape, or *crêpe de chine,* is a soft, white or colored silk fabric, of gauzy texture and wavy appearance, used for ladies' scarfs, shawls, hat trimmings and evening dresses. A woolen fabric made with a crinkled surface is also called crape, and the name crape paper is applied to a crinkled paper used for table decorations, napkins, etc.

CRAS'SUS, MARCUS LICINIUS (114–53 B. C.), a famous Roman, surnamed *Dives* (the rich). He took part with Sulla in the Civil War, and in 71 B. C. he defeated Spartacus (which see) at Rhegium. In 70 he was elected consul, with Pompey as his colleague, but the two shortly came into conflict and were not reconciled until 60 B. C., when Caesar induced them to form with him the first triumvirate (which see). Five years later Crassus again became consul, and, obtaining Syria for his province, he made war on the Parthians, but was defeated and slain.

CRAWFISH, or **CRAYFISH**, the name of various crustaceans (see CRUSTACEA). In structure they are very like the lobster, and the young are carried under the broad tail of the mother in the same way as with the lobsters. The crawfish inhabits the fresh waters of the United States, Europe and the north of Asia, and is common in some of the streams of England, where it is considered an excellent article of food. It lurks under stones or in holes in the banks. Its food consists of small mollusks or fishes, the larvae of insects and almost any sort of animal matter. Some crawfish, by their burrowing habits, injure milldams and levees. About thirty species are known in America, where they are often called crabs.

CRAWFISH

CRAWFORD, FRANCIS MARION (1854–1909), an American novelist, who vividly portrayed life in foreign lands. He was the son of Thomas Crawford, a sculptor, and was born in Italy. Crawford received his education at Concord, N. H., in Trinity College, Cambridge, and at Karlsruhe and Heidelberg. At Rome he devoted himself to the study of Sanskrit, and during 1879 and 1880 was engaged in press work at Allahabad, India. He was selected by the government committee to write the national ode at the centennial of the American Constitution, Sept. 17, 1887. His first novel, *Mr. Isaacs* (1882), was a book of striking and quite unusual merit and at once won for its author popularity. The rich romantic elements in certain of the aspects and contrasts of modern Oriental life were a distinct discovery to worked-out novelists. Among its successors are *Dr. Claudius, A Roman Singer, Zoroaster, The Story of a Lonely Parish, Saracinesca, The Witch of Prague, Paul Patoff, Don Orsino, Sant' Ilario, In the Palace of the King* and *The White Sister.* He possessed imagination, originality and vigor, and used a graceful and vivid style.

CRAWFORD, THOMAS (1814–1857), an American sculptor, born in New York. He studied in Rome and became the pupil of Thorwaldsen. His best known works comprise *Orpheus and Cerberus, Adam and Eve, Hebe and Ganymede, Mercury and Psyche* and *The Indian.* He executed important works for the National government and for the State of Virginia. Perhaps his most important work is the statue of *Liberty,* nineteen and a half feet high, which surmounts the dome of the Capitol building at Washington.

CRAW'FORDSVILLE, IND., founded in 1822 and made a city in 1865, is the county seat of Montgomery County, forty miles

northwest of Indianapolis, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Vandalia and the Monon railroads. The city is the seat of Wabash College (325 students); it has a Carnegie Library and a $100,000 Y. M. C. A. building. The home of General Lew Wallace, author of Ben Hur, was here. Wire, nails, matches and furniture are manufactured. Population, 1910, 9,371; in 1917, 11,443 (Federal estimate).

CRAYFISH. See CRAWFISH.

CRAY'ONS, pencils in various colors made of clay, plumbago, chalk and other material, such as pigments for colorings. Crayons used in drawings to be photographed are commonly made of a mixture of wax, soap, resin and lampblack. Black crayons are made of the finest quality of charcoal. A kind of *crayon painting* is practiced to some extent, the coloring matter in a soft state being rubbed on with the finger. Its chief advantages consist in the facility of its execution and the soft beauty and richness of the coloring.

CREAMERY, *kreem'ur y,* or **BUTTER FACTORY,** a factory where butter is made. Creameries are organized on three plans: by the association of farmers of the neighborhood, who build and operate the creamery and share proportionally in its profits; by the formation of a stock company, in which the stockholders are patrons, and by individuals, who build the creamery, buy the milk and sell the butter. Creameries gather both cream and milk and pay for each according to the amount of butter fat it contains, this being determined by a milk or cream tester. The by-product of the creamery is skim milk, most of which is returned to the patrons or is sold. It is taken to the farms and fed to calves or pigs. Dried curd, or casein, is also made from it and is of some commercial importance.

A well-equipped creamery contains apparatus for testing the milk and cream, a tank for receiving the milk, another for holding the cream and a third for the skim milk. The machinery consists of a motor, which is usually a gas engine, the cream separator, churns and butter works. An average-sized creamery will use from 8,000 to 10,000 pounds of milk in a day, and some of the largest have a capacity for making fifteen tons of butter every twenty-four hours. Creameries are in charge of skilled buttermakers, who have usually learned their trade at agricultural experiment stations or agricultural colleges.

In the United States Wisconsin leads in the output of creamery butter, and in Canada, Ontario and Quebec together produce about nine-tenths of the Dominion's yield. See BUTTER; DAIRYING; MILK.

CREAM OF TAR'TAR, or **POTAS'SIUM BITAR'TRATE,** exists in grapes, tamarinds and other foods. It is prepared from the crystalline crust called *argol,* deposited on the vessels in which grape juice has been fermented. The argol is dissolved by boiling with water, the mixture is filtered and the cream of tartar is allowed to crystallize. The commercial product usually contains a small percentage of calcium tartrate. It is frequently employed in medicine, in dyeing wool, to fix colors and as a part of baking powder.

CREAM SEPARATOR, a machine by which cream is separated from milk. The various models now in use all conform to the same principle, that of centrifugal force (which see). The separator consists of a revolving bowl, or drum, into which the milk flows. The bowl is made to whirl around at the rate of 5,000 to 8,000 revolutions a minute, and as it revolves the cream collects at the center, while the heavier parts of the milk are thrown against the outer rim. There are separate tubes through which the cream and skim milk flow out. These machines are operated by hand, electric, steam, water and horse power.

CREASY, *kre'sy,* EDWARD SHEPHERD, Sir (1812–1878), an English historian, remembered chiefly as the author of *Fifteen Decisive Battles of the World* (see Article under that title). In 1840 he was appointed professor of history at the London University, and in 1860 was made chief justice of Ceylon, receiving at the same time the honor of knighthood.

CRECY, *kra se',* FRANCE, a town about 100 miles north of Paris, celebrated for the victory gained there by Edward III over a French army under Philip VI, August 26, 1346. About 300,000 of the French army were slain, including King John of Bohemia and many of the nobles. This battle was the first important conflict of the Hundred Years' War (which see). It was one of the first battles in which gunpowder was used, and it marked a definite step in the decline of feudalism, as it demonstrated the superiority

of the common foot-soldier over the knights in armor. At Crecy the English Black Prince won fame.

CREDIT, in economics, is the confidence existing between the creditor and his debtors, by which the payment of amounts due is postponed. This confidence may be based on either or both of two factors, trust in the honor and ability of the debtor, or security deposited by him to assure the payment of the debt. A common example of the former kind of credit is that of the so-called *trust,* or *book accounts,* of retail merchants.

Credit transactions involving the giving of security are usually evidenced by a so-called instrument of credit—that is, a note, bill, mortgage or bond. Transactions of this latter kind have become common in business, for when a debt is evidenced by a written instrument, the account can be transferred from one party to another, and money can be raised immediately, even before the debt is due. The development of the credit system in business is of comparatively recent date, and its growth has been favored by several movements, namely, the general raising of moral standards incident to advancing civilization, and the gradual increase in the rigidity of business law, through statutes and judicial interpretation, always toward the greater security of the creditor.

The credit system to-day underlies a vast majority of commercial transactions. Its advantage lies in the fact that by obviating the use of actual money in many instances, it frees for investment and other commercial purposes funds which otherwise would have to be held for use in minor affairs. It is in this way that modern banks have become such an important part of the industrial system. By collecting wealth which has been lying idle in the hands of a great number of persons who are either unwilling or unable to make loans, they make possible transactions of much greater importance. See BANKS AND BANKING.

Public Credit. This term signifies the confidence which men feel in the ability and disposition of a nation to pay its debt. The credit of an individual or firm refers to the reputation for meeting obligations; so the credit of a bank depends upon the degree of confidence which the community places in its ability to redeem its notes.

CREDIT, LETTER OF. See LETTER OF CREDIT.

CREDIT MOBILIER OF AMERICA. This was a title adopted by a joint stock company organized in Pennsylvania in 1863, with a capital of $2,500,000. In 1867 the charter was purchased by a company organized for the construction of the Union Pacific Railroad, and in 1872 it became known that several members of Congress, as well as the Vice-President, were secret stockholders. This fact, together with the enormous rights and profits connected with the company, led to a congressional investigation, which developed a huge attempt at bribery and corruption. It was charged that several leading advocates of the plan had been bribed by donations of large blocks of shares in return for their influence. As a result, resolutions of censure were passed by Congress, and one member was sentenced to expulsion, but the sentence was never carried out. The scandal, after a time, died away, and the road proposed was finally built.

CREE, once one of the largest and strongest of the Algonquian tribes. They originally occupied a large territory in what is now Manitoba and Saskatchewan. After the whites began to settle the country the Cree Indians sold their lands to the Canadian government.

CREED, a statement of what one believes, employed most generally in regard to religious beliefs. The Apostles', the Nicene, the Chalcedonian and the Athanasian may be said to form the great creeds of the Christian Church.

The Apostles' Creed is so called from the belief that it originated with the Apostles themselves. The present text dates from the year 500, but evidently depends upon an earlier form, which may be traced back to about A. D. 150. The Nicene, the next oldest creed in the history of the Church, was adopted by the Council of Nice, A. D. 325, to settle the controversy concerning the dignity and character of Christ, and its essence is the expression of the belief that "Christ is of the *same* substance with the Father."

The Creed of Constantinople, which supplements the Nicene, emphasizes in particular the divinity of the Holy Ghost. The Athanasian Creed, dating from about the sixth century, is so called because it embodies particularly the doctrines of the Holy Trinity and the incarnation of the Son of God, which were so ably upheld by Saint Athanasius. These creeds were later supplemented

by the Councils of Trent and of the Vatican. Besides these great creeds, the various Protestant churches have their confessions of faith, which give a more detailed statement of their doctrines. Thus, the Lutheran Church has the *Symbolic Book of the Evangelical Church*; the Church of England, the *Thirty-nine Articles,* and the Presbyterians, the *Westminster Confession of Faith,* which is one of the most elaborate of all creeds and grew out of the Puritan agitation of the seventeenth century.

CREEKS, once the strongest Indian confederacy south of New York, excepting the Cherokee. The Creeks occupied a large portion of Georgia and Alabama and probably numbered 30,000. They built log houses in permanent villages. During the Revolution they sided with the English, and in the War of 1812 a part of them rose against the Americans and indulged in the terrible massacre at Fort Mims. In 1814, in a fierce battle at Horseshoe Bend, they were completely defeated. They stubbornly resisted every effort of the government to educate them and refused to give up their lands until they were forced to do so. They are now living in Oklahoma as the Creek Nation. There are between 6,000 and 7,000 of pure Indian stock, besides many others of mixed Indian, white or negro blood. See FIVE CIVILIZED TRIBES.

CREEP'ER, a name given to almost any

BROWN CREEPER

small bird that runs up and down the trunks of trees looking for insects. The common brown creeper of the United States is a good example. It builds its nest usually in holes or in the crevices of trees, and it is remarkably active in its habits. It begins at the bottom of a tree and works rapidly up, searching all the crevices of the bark. When it decides to leave the tree, it flies to the bottom of another and again works its way up, using its sharp-pointed tail feathers to push itself along.

CREMATION, *kre ma'shun,* the burning of the bodies of the dead. It was a frequent practice in ancient times and is now advocated on hygienic grounds by many scientific men on account of the dangers to the living caused by the presence of graveyards. From an economic standpoint cremation is advocated as a solution for the disposal of bodies in thickly-populated districts. There are some who object to it on sentimental and religious grounds, and there are others who state that since detection of criminal poisoning cannot be obtained when bodies are burned, cremation is an aid to crime. A favorable attitude toward the practice is, however, increasing.

CREOLE, *kre'ole,* the name which was originally given to all the descendants of Spaniards or Frenchmen born in the southern part of the United States and in the West Indies. The term is sometimes incorrectly applied to a mulatto, but it properly implies purity of European blood.

CRE'OSOTE, a substance discovered by Reichenbach in 1832 in wood tar, from which it is separated by a tedious process. It is generally obtained, however, from the products of the destructive distillation of wood. In a pure state it is oily, heavy, colorless, has a sweetish, burning taste and a strong smell of peat smoke or smoked meat. It is a powerful antiseptic. Wood treated with it is not subject to dry rot or other disease.

CREPE. See CRAPE.

CRESCENT, *kres'sent,* a representation of the moon in its horned state, used by the ancient Egyptians and the Greeks as the symbol of their moon goddesses. It was the emblem of the old city of Byzantium, and was adopted by the Turks when they captured Constantinople in 1453. After the establishment of the Turks in Europe, it was the universal emblem of their empire. A Turkish order of knighthood, instituted by Selim, sultan of Turkey, 1799, was known as the Order of the Crescent.

CRES'CENT CITY, a name proudly borne by the city of New Orleans, because formerly the greater part of the town lay in a great crescent-shaped bend of the Mississippi River.

CRESS, the name of several species of plants, most of them of the mustard family. Water-cress makes a delicious salad, as its leaves have a moderately pungent, bitterish and slightly salty taste. It grows in cool springs and rivulets.

CRETACEOUS, *kre ta'shus*, **SYSTEM**, or **CHALK SYSTEM**, a system of rocks between the Jurassic, below, and the Eocene, above, and the oldest system of the Mesozoic Era. It takes its name from the chalk beds which form a prominent feature of it in England and France, but the chalk formations constitute only a small portion of the system. In North America cretaceous rocks are numerous and extend over large areas, following the Atlantic coast from New Jersey to Florida, and the gulf coast from Florida to Texas, then extending up the Mississippi Valley to the mouth of the Ohio. They also form extensive areas in the great plains along the Rocky Mountains, extending northward as far as the mouth of the Mackenzie River and southward into Mexico. On the Pacific coast the rocks of the system appear at numerous points from California to British Columbia. The fossils show a great variety of animal and vegetable life. Among the animals were flying reptiles, birds with teeth, large sea serpents and land reptiles of great size. The plants show that trees similar to the oak, birch and poplar existed. See GEOLOGY.

CRETE, *kreet*, an island in the eastern part of the Mediterranean Sea, belonging to Greece since 1913. It is 156 miles long and from seven to thirty miles in width, its total area of 3,300 square miles being not quite that of Delaware and Rhode Island combined. Manufacturing and trade are insignificant; the population subsists upon the local agricultural products, which are grain, wine, oil, wool, fish, etc. The people numbered 344,000 in 1915, about one-third as many as in ancient times. The capital city is Candia, with 25,185 people in 1915. The greatest Cretan of modern times is Eleutherios Venezelos (which see).

The early history of Crete is lost in the fables of Greek mythology, in which Saturn, Zeus and Minos are spoken of as among its kings. At one time a republic, it was the seat of the Cilician pirates till conquered by the Romans, from whose hands it passed in 823 to the Saracens and then to the Greeks again in 962. In 1204 the Byzantine sovereign sold it to the Venetians, who held it until the second half of the seventeenth century, when the Turks conquered it after a desperate struggle, ending in a siege of the capital lasting for no less than twenty years. Insurrections against Turkish rule have more than once occurred; a formidable one, fomented by Greece in 1868, was with difficulty suppressed after a long conflict. There have been many revolts and uprisings in the last fifty years, due to the discontent under the rule of the sultan. In 1898 Prince George of Greece was made High Commissioner, with a guarantee of autonomy by Great Britain, Russia, France and Italy; after the Turko-Balkan War the island was formally annexed to Greece.

CRETONNE, *kre tahn'*, a cotton fabric whose chief characteristic feature is its showy pattern. It is widely used to make window hangings, bags, chair covers and numerous other articles familiar to the housewife. The cloth has an uneven surface, and the colors printed on it give a peculiarly attractive effect. Flowers and conventional designs are popular patterns for cretonne. The cloth sells for as low as twenty-five cents a yard, but there are expensive grades ranging to five dollars in price.

CRIB'BAGE, a favorite game at cards, played with the whole pack. It may be played by two, three or four persons; and when by two five or six cards may be dealt to each. Five-card cribbage played by two persons is the most scientific game. Sixty-one points make the game; there are no tricks and no trumps, the object being to make *pairs, fifteens, sequences* or the *go*, or to prevent the adversary from doing the same.

Court cards and tens count as 10 each, and all the rest count for the number of spots upon them. Every *pair*, that is, every couple of cards of the same value belonging to different suits (two aces, two fours, two kings), counts 2; and when there are three or four similar cards, as many pairs are counted as there are different combinations of the cards, taken two at a time. Every combination of cards, the united spots of which make up fifteen, counts 2. A sequence

consists of three or more cards of any suit following one another in rank, and counts 1 for each card. When the player whose turn it is to play cannot play a card without going beyond thirty-one, the other player scores 1 for having been the nearest to thirty-one. This is called scoring 1 for the *go*. The last card played in any hand counts 1, also. When all the cards in a hand, either with or without the turn up card, are of one suit, or when all the cards in the crib, with the turn up card, are of one suit, it is called a *flush* and counts 1 for each card. When the turn up card is a knave the dealer scores 2 *for his heels*. When a knave of the same suit with the turn up card is found in the hand of either player, the player in whose hand it is scores 1 *for his nob*.

The counting is usually kept on a regular *board*, by means of two pins for each player. In the board are two sets of 30 holes, in groups of five, and as the game progresses the pins are moved forward. Twice around the board and into the *home* hole makes the game.

CRICHTON, *krī'ton*, JAMES (1560–1585), called *The Admirable Crichton*, a Scottish celebrity, son of Robert Crichton, lord advocate. Before he was twenty he had perfected himself in almost all the knowledge of his time, and he visited Paris, Genoa, Venice, Padua and Mantua, challenging all scholars to learned disputations, vanquishing doctors of the universities and disarming the most famous swordsmen of the time in fencing. He was latterly tutor to a son of the Duke of Mantua, and is said to have been stabbed to the heart in a dastardly manner by his pupil.

CRICK'ET, a little insect about an inch long, of a blackish or brownish color, common in houses and cultivated gardens. By rubbing together its peculiarly formed wing covers, the male can produce the pleasant chirping sound by which these insects are so well known and which has become associated with cheerful fireside scenes. There are a number of different species, which differ in color and form from the common cricket. See MOLE CRICKET.

During the day crickets usually remain in the ground or in darkened spots. At night they go forth in search of their food, which consists of plant life. Eggs are laid in loose soil during the fall, and these hatch in the spring.

CRICKET, the great English national game, and almost equally popular in Britain's colonies. It is played with bats, balls and wickets on a piece of smooth greensward. It is played by two opposite sets or sides of players, numbering eleven each. Two *wickets* of three *stumps* each are placed fronting each other at a distance of about 22 yards apart, the stumps being upright rods stuck in the ground, and projecting 27 inches. On the top of each set of stumps are placed two small pieces of wood, called *bails*. After the rival sides have tossed for the choice of either taking the bat or fielding, two men are sent to the wickets, bat in hand. The opposite or fielding side are all simultaneously engaged; one (the bowler) being stationed behind one wicket for the purpose of bowling his ball against

CRICKET FIELD

the opposite wicket, where his coadjutor (the wicket keeper) stands ready to catch the ball should it pass near him; the other fielders are placed in such parts of the field as are judged most favorable for stopping the ball

after it has been struck by the batsman or missed by the wicket keeper. It is the object of the batsman to prevent the ball delivered by the bowler reaching his wicket, either by merely stopping it with his bat or by driving it away to a distant part of the field. Should the ball be driven any distance, the two batsmen run across and exchange wickets, and continue to do so as long as there is no risk in being "run out," that is, of having the stumps struck by the ball while they are out of their position near the wickets.

Each time the batsmen run between the wickets is counted as a "run" and is marked to the credit of the striker of the ball. If the batsman allows the ball to carry away a bail or a stump, if he knocks down any part of his own wicket, if any part of his person stops a ball that would have otherwise reached his wicket, or if he strikes a ball so that it is caught by one of the opposite party before it reaches the ground, he is "out," that is, he gives up his bat to one of his own side, and so the game goes on until all the men on one side have played and been put out. This constitutes what is called an "innings." The other side now take the bat and try to defend their wickets and make runs as their rivals did.

Usually two innings are played. The side scoring the greater number of runs wins.

CRIME, a wrong committed against a state, therefore an offense against all the people of the state. If a man is robbed, the security of the entire community is threatened, and all the people have common interest in punishing the guilty persons. There are different degrees in crime. The most heinous offense known to man is *treason,* which is an attempt to betray an entire nation to its enemies, or to give them even slight aid or comfort; *felony* is so serious an infraction of the law that punishment often extends to long periods of years and to the imposition of heavy fines. A *misdemeanor* is a minor offense.

See Treason; Felony; Misdemeanor, and the various crimes of magnitude such as Murder, Robbery, Larceny, Arson, Conspiracy, etc.

Criminology is that social science which conducts a scientific study of crime, in all its phases, with the hope of decreasing wrongdoing and reforming the wayward. The habits of criminals are studied; the machinery of justice is considered in its bearings upon reformation; methods employed in prisons and jails are investigated, to the end that reform and not persecution and further hardening of moral sensibilities, may be accomplished. The subject has challenged the best thought of many people, and progress in checking evil tendencies is discernible.

CRIME'A, a peninsula of Southern Russia, between the Sea of Azov and the Black Sea, united to the mainland by the Isthmus of Perekop. It is about 200 miles long and 110 miles broad. Three-fourths of the Crimea belongs to the region of steppes, but the other part, confined entirely to the south and stretching along the coast from west to east, abounds in beautiful mountain scenery. Here the valleys are luxuriant with vines and olive and mulberry plantations, while the northern slope gives a large yield in cereals and fruits. The most important of the productions, besides those already mentioned, are flax, hemp and tobacco, of which a large quantity of excellent quality is produced. The forests are of limited extent. Fine-wooled sheep, horned cattle and horses are reared in large numbers. The chief town and port is Sebastopol; population, 1914, 61,849.

The country was anciently associated with the Cimmerians and in later times with various Greek settlements and minor kingdoms. After being for some time a dependency on Rome, it was overrun by barbarians, and in 1237 it fell into the hands of the Mongols, under Genghis Khan. About 1261 the Genoese were permitted to occupy and fortify Kaffa, and they rapidly extended their power in the formation of other settlements. They were expelled, however, in 1475 by Mahomet II, who made it a dependent khanate. In 1783 the Russians took possession of the country; and with the view of overawing the Turks the great naval arsenal of Sebastopol, occupying the most commanding position on the Black Sea, was begun by Catharine II in 1786. Its military resources were steadily developed up to the time of the Anglo-French campaign (see CRIMEAN WAR) of 1854, when it fell into the hands of the allies, by whom it was held until March, 1856. It was then restored to Russia.

In the World War, after the collapse of Russia the Crimea suffered the fate of other parts of Western Russia. It was overrun by the Germans, and later it suffered under Bolshevik misrule.

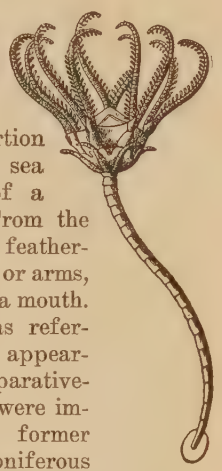
CRIMEAN WAR, the struggle caused by the attempt of the allied powers of England,

France and Turkey to prevent the aggressions of Russia in Turkey. The old plans for the extension of Russian power conceived by Catharine II were revived by Nicholas I, who, believing that he had secured himself from interference on the part of Austria and Prussia, and that an Anglo-French alliance was impossible, prepared to carry them out. Serbia, Bosnia, Bulgaria and the principalities of the Danube were to become protectorates, and Constantinople was to be provisionally occupied by Russian troops. However, the first markedly aggressive step, the demand by Russia for a protectorate over the Greek Church throughout the Turkish Empire, brought matters to a crisis. After a vain attempt to negotiate, the Russians occupied the Danubian principalities, and war was declared by Turkey in October, 1853, by France and England in 1854 and by Sardinia in 1855.

It soon became obvious that the Crimea must be the seat of the war, and the allied troops landed there in September, 1854. Five days after their arrival the Battle of Alma was won by the allies, and the march was then continued toward Sebastopol. The siege of Sebastopol was begun in October by a grand attack which proved a failure, and the Russians retaliated by attacking the English at Balaklava (October 25), but were defeated with heavy loss. It was at this battle that the famous, but useless, charge was made by the Light Brigade.

A second attack at Inkermann was again repulsed by the allies, but the siege works made slow progress during the winter, during which the ill-supplied troops suffered great privations. The death of Nicholas and the succession of Alexander II, in March, 1855, brought no change of policy. The bombardment was continued, and in September the French successfully stormed those parts of the fortifications known as the Malakoff and the Little Redan. The Russians then withdrew from the city to the north forts and the allies took possession. The chief subsequent event was the capture of Kars, in Asia, by the Russians, after a splendid defense by the Turks. By this time, however, the allies had possession of the Crimea, and overtures of peace were gladly accepted. A treaty was accordingly concluded at Paris in March, 1856, by which the independence of the Ottoman Empire was guaranteed.

CRINOIDEA, *kri noi' de ah,* or **SEA LILIES**, a group of sea animals, consisting of creatures which are attached during the whole or a portion of their lives to the sea bottom by means of a jointed, stony stem. From the tip of this stem radiate feather-like, flexible appendages or arms, in the center of which is a mouth. Their popular name has reference to their flowerlike appearance. Though now comparatively few in number, they were immensely numerous in former ages, and many carboniferous limestones are almost entirely made up of the stems, which break apart into circular sections. See ECHINODERMATA.



ONE OF THE LIVING CRINOIDEA

CRINOLINE, *krin'o lin,* originally, a stiff, wiry fabric, made of horsehair and used by women for petticoats, to make their dress skirts stand out from the figure. Later, the same name was applied to the hoop skirt, an article made of steel wire and tapes and used for the same purpose as the crinoline. Modern crinoline is a cotton gauze, dressed with glue. It is used for stiffening garments and as a material for hat frames.

CRIPPLE CREEK, COLO., founded in 1890 in the midst of a rich gold-mining section, is the county seat of Teller County, about thirty miles southwest of Colorado Springs. The city is on the Colorado Springs & Cripple Creek, the Colorado Midland and the Florence & Cripple Creek railroads. The industries largely center around the gold mines, which have yielded over $300,000,000 of ore; nearly 5,000 men are employed in the district. The town was burned in 1896 and was at once rebuilt. The scenery in the vicinity is unsurpassed. Population of the town, 1910, 6,206; of the district, about 22,000.

CRITTENDEN COMPROMISE, a proposal introduced in the United States Senate in 1860 by Senator John Crittenden for the passage of an amendment to the Constitution, which would divide the Union into two sections, one composed of free states and one of slave states, the boundary line being the latitude of 36° 30′. The Federal government was not to have the power to abolish slavery

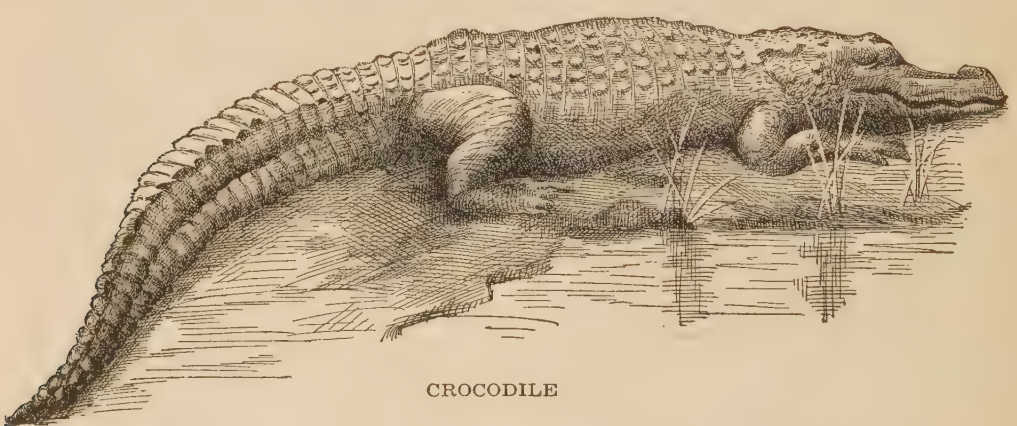
in the District of Columbia, nor to prohibit the interstate slave trade, nor to abolish slavery in a slave state. It was lost in the Senate on March 2, 1861, by a vote of 20 to 19, and in the House, January 14, 1861, by a vote of 113 to 80.

John Jordon Crittenden (1787–1863) the author of the Crittenden Compromise, was a native of Kentucky. He was graduated at William and Mary College served in the War of 1812, in the state legislature, in the United States Senate, several times as attorney general and finally as governor of Kentucky. Largely through his influence the state of Kentucky maintained its adherence to the Union.

CROATIA, *kro a'she a,* and **SLAVONIA,** *sla vo'ni a,* formerly a crownland of the kingdom of Hungary, one of the two main divisions of the former Austro-Hungarian monarchy. In 1918, on the dissolution of Austria-Hungary, the people of Croatia and Slavonia joined with various other southern Slavic peoples and formed the new Jugo-Slavic nation (see JUGO-SLAVIA). Agram, the capital city of Croatia and Slavonia, was made the headquarters of the national council of the new state.

According to the old boundaries, Croatia is the larger and western portion of the crownland, and Slavonia, lying between Hungary proper and Bosnia, is the eastern. The crownland is separated by the Drave and the Danube from Hungary proper, on the northeast, and by the Save from Serbia and Bosnia, on the south. Dalmatia and the Adriatic Sea are on the southwest, and Styria, Carniola and Istria are on the west. The total area is 16,425 square miles; the population was estimated at 2,619,291 in 1913.

CROCK'ETT, DAVID (1786–1836), a famous American frontiersman, soldier and politician, born in Tennessee. His early training was that of the typical wild frontier of the early nineteenth century. He received little or no education, but had native shrewdness and wit and by an outdoor life he became a remarkably skilful hunter. He took part in the war against the Creek Indians, serving under General Andrew Jackson, and was three times elected to Congress, where he attracted attention by his eccentricity of manner and dress. Soon after retiring from Congress, he took up arms with the Texans in their war for independence, and at the Alamo in 1836 he was one of the six survivors of the siege who were captured and massacred by the Mexicans. He published during his lifetime, several books of travel and adventure, among which were *A Narrative of the Life of David Crockett, A Tour to the North and Down East* and *Exploits and Adventures in Texas.* They were all characterized by atrocious grammar and crude and often coarse humor, but they displayed the same untrained common sense which he exhibited in his eventful career.



CROCODILE

CROCODILE, *krock'o dile,* the most highly-developed reptile, allied to the alligator. These two reptiles differ in that the crocodile has a narrower head than the alligator, and a sharper snout. Its tail is also more vertically flattened, and it is more agile and lighter in weight than the alligator. The true crocodile inhabits the warm regions of the eastern hemisphere, though some species are found in North and South America. The crocodile of the Nile is one of the best known

members of the family. In olden times this animal was worshiped by the Egyptians, who preserved the bodies of crocodiles with almost as great care as the bodies of human beings. The natives of Southern Asia and the Moluccas fear the species common there, because of its fondness for human flesh. The skin and flesh of the crocodiles form articles of commerce of considerable importance, the tough skin making a durable and valuable leather. See ALLIGATOR; GAVIAL.

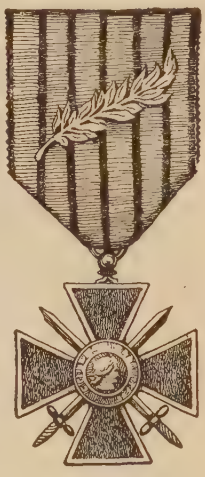
Crocodile Bird, a bird of the plover family, found in the Nile Valley, so called because it has the habit of running over the bodies of crocodiles in search of food. The birds feed on insects and shellfish which cling to the sides of the crocodiles, and they even take parasites and bits of food from their lips and gums.

CROCUS, *kro'kus*, a genus of plants of the Iris family, one of the most common ornaments of spring gardens. Most of the species are natives of the south of Europe and Asia Minor, and three grow wild in Britain. The early spring flowers appear as soon as the snow has left the ground, even before their leaves. They are of a great variety of colors, and unless the winters are very cold, will grow from year to year.

CROCUS

CROESUS, *kree'sus*, the last king of Lydia, who lived in the sixth century B. C. His riches, obtained chiefly from mines and the gold dust of the River Pactolus, were greater than those of any king before him, so that his wealth became proverbial. After a reign of fourteen years his empire fell to the possession of Persia.

CROIX DE GUERRE, *krawh de gare*, the French for "cross of war," is the name of a French military decoration instituted by law of April 8, 1915. The Croix de Guerre is made of Florentine bronze. It consists of four branches, among which are two crossed swords. On the reverse side the center represents a head of the republic bearing a Phrygian bonnet, ornamented by a laurel crown on which is engraved "French Republic." On the other side is the inscription "1914–1915, 1914–1916," etc. The cross is worn on the left side of the breast immediately after the Legion of Honor or the Military Medal, and is fastened to a green ribbon having a red edge on each border and five red bands parallel with the edges.



CROIX DE GUERRE

This decoration was instituted to commemorate, from the beginning of the World War, special acts of bravery. It was conferred on military men of the armies on land or sea, whether French or foreigners, who obtained certain citations for bravery during the war against Germany. Civilians and members of the different military personnels also received the cross if they obtained one of the citations. Citations are distinguished in the following way:

Army: a palm of bronze in the form of a laurel branch.
Army Corps: a silver-gilt star.
Division: a silver star.
Brigade: regiment or assimilated unit, a bronze star.

Several citations obtained for various acts of bravery are distinguished by the number of stars corresponding to their degree, or by palms. The disposal of the palms being difficult on the ribbon when the number of palms exceeds five, for the fifth palm a silver palm replaces on the ribbon of the Croix de Guerre the five bronze palms. When the citation was given to a corps the Croix de Guerre was attached to the flag or standards of the corps.

CROMWELL, OLIVER (1599–1658), one of the great characters in English history, the leading figure in the revolution that dethroned Charles I. Cromwell was born at Huntingdon and educated at Sidney-Sussex College, Cambridge. He married Elizabeth, daughter of Sir James Bourchier, and for some years after his marriage he lived on his estate in Huntingdon. In 1628 he was member of Parliament, but he seems to have made no pronounced impression on that body at that time. In 1631 he went with his family to a farm which he had taken at Saint Ives; and some years later he removed to Ely,

where he had inherited a property. He was again elected to Parliament in 1640 and took part in its deliberations on all important topics, without, however, becoming very prominent.

About this time the struggle between Parliament and the king was becoming acute, and the summer of 1642 found Cromwell, who was naturally a warrior, actively engaged in raising and drilling volunteers for the Parliamentary party. He served as captain and colonel in the earlier part of the civil war, distinguishing himself through his disciplinary powers and the well-drilled character of his troops. When the army was reorganized and, through the "self-denying" ordinance, all members of Parliament were excluded from commands, an exception was made in favor of Cromwell, who kept his command of the cavalry. On the occasion of the surrender of Charles by the Scottish army in 1646, Cromwell was one of the commissioners, and in the distribution of rewards for services he received $12,500 a year from the estates of the Marquis of Worcester. Affairs in Ireland demanding his presence, he was appointed lord-lieutenant and commander in chief; and by making a terrible example of Drogheda, he crushed the royalist party in that country within six months. Resigning the command of Ireton, he undertook, at the request of the Parliament, a similar expedition against Scotland, where Charles II had been proclaimed king. He saved himself from almost inevitable disaster by the splendid victory at Dunbar, and a year later he put an end to the struggle by his total defeat of the royalists at Worcester.

OLIVER CROMWELL

The Rump Parliament, as the remnant of the Long Parliament was called, had become worse than useless, and in April, 1653, Cromwell, with his soldiers, dispersed that body. He then summoned a council of state, consisting mainly of his principal officers, which finally chose a Parliament of persons selected from the three kingdoms, nicknamed *Barebones Parliament*, or the *Little Parliament*. Fifteen months later a new annual Parliament was chosen; but Cromwell soon prevailed on this body, which was totally incapable of governing, to place the charge of the Commonwealth in his hands. The chief power now devolving again upon the council of officers, they declared Oliver Cromwell sole governor of the Commonwealth under the name of Lord Protector. Although practically absolute, Cromwell's government was wise and moderate, and restored England in the eyes of other nations to the position of dignity which had been lost. He made the nation respected and feared throughout Europe, and he maintained order at home until his death, in 1658. In 1899 Parliament erected a statue in his honor in Westminster, facing Whitehall.

Related Articles. Consult the following titles for additional information:

Charles I	Long Parliament
Charles II	Naseby, Battle of
Commonwealth of England (History)	Restoration
	Rump Parliament

CROMWELL, THOMAS, Earl of Essex (about 1490–1540), an English statesman who was one of the most pliant servants of Henry VIII. The king was much impressed by Cromwell's able defense of Cardinal Wolsey, in a case of impeachment tried in Parliament, and made him his private secretary. From this position Cromwell rose to be Chancellor of the Exchequer, Lord of the Privy Seal and Earl of Essex. Cromwell's subserviency, however, eventually caused his downfall. Having vigorously promoted the marriage of Henry and his third wife, Anne of Cleves, he fell under his master's displeasure when that tyrant tired of his wife, and accordingly Henry permitted the Earl to be tried for treason. At the height of his career, Cromwell was condemned and beheaded. Because of his vigorous efforts to suppress the monasteries, he was called "Hammer of the Monks." See HENRY VIII.

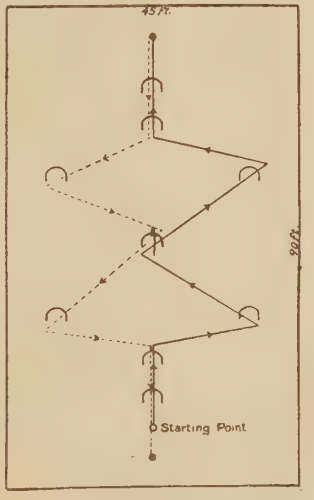
CROOKES, WILLIAM, Sir (1832–1919), one of England's most honored scientists, was born in London and educated at the Royal College of Chemistry. He began his career as superintendent of the meteorological department of Radcliffe Observatory and then became professor of chemistry at the Chester Training College. Professor Crookes occupied a foremost place among scientific men and was considered highest authority on the application of the principles and laws of chemistry to the industrial arts

and on sanitary matters. Also he gave much attention to the relation of chemistry to various lines of industry, and among his discoveries is the sodium amalgam process for separating gold and silver from their ores and a special method for the study of substances through the spectroscope. His experiments in electricity led to the invention of Crookes tubes (see CROOKES TUBES), so generally used in electrical experiments. Among his most widely known works are *A Practical Handbook of Dyeing and Calico Printing, Select Methods of Chemical Analysis, Dyeing and Tissue Printing, A Solution of the Sewage Question; The Profitable Disposal of Sewage, The Wheat Problem and Diamonds.*

CROOKES TUBES, glass tubes or vessels from which the air has been exhausted and which contain electrodes at opposite ends. These tubes are used in electricity to secure various effects of electrical discharge, and are indispensable in the making of apparatus to produce X-rays. They take their name from the inventor, Sir William Crookes (which see).

Geissler tubes, invented by Geissler, are of a similar pattern. When used in connection with an induction coil and an electrical machine in the dark room, these tubes produce many beautiful luminous effects. A peculiar pattern of them is also used in the production of cathode rays (which see).

CROQUET, *kro ka',* an open-air game, in which two or more persons with long or short-handled mallets endeavor to drive balls through a series of nine or ten wire arches (*wickets*) set in the ground in a certain arrangement. In the accompanying figure the wickets are set in the most common way. A croquet set consists of eight balls, painted to correspond with eight mallets; two stakes, with bands to match the colored balls in the same order on each, and ten wickets. The object of the game is to start from one stake, drive the ball through the arches on one side, touch the lower stake and return through the arches of the other side to the starting stake (see the diagram). If two people play, each may use two balls; but when four play, each has but one ball. The players play alternately, and the side first completing the circuit wins the game. Special rules are formulated to cover emergencies, and a number of technical terms are in general use. A *rover,* for instance, is a ball that has made the circuit of the field but has not finally touched the starting stake; such a ball may play upon every other ball in the field in one turn. A *dead ball* is one that has been played upon since a point was made.



CROQUET GROUND

CROSBY, *krawz'bi,* FANNY (1820–1915), a blind hymn writer, whose influence in this field has been second only to that of Charles Wesley. She was born at Southeast, N. Y. At the age of six weeks she became blind through the application of a hot poultice to her eyes, but this affliction seems only to have intensified her deep religious feelings in after life. At the age of fifteen she became a pupil at the New York Institution for the Blind, and during twelve years of residence there she displayed a marked aptitude for verse form. In 1847 Miss Crosby became a teacher in the Institution, and in 1858 she married a blind musician Alexander Van Alstyne. Of more than 7,000 hymns from her pen, the best known include *Safe in the Arms of Jesus,* her favorite; *Pass Me Not; Jesus is Calling; I am Thine; Blessed Assurance; Rescue the Perishing,* and *Close to Thee. There's Music in the Air* is the best known of her secular songs. She also published two volumes of poems and an autobiography, *Memories of Eighty Years.*

CROSS, one straight body laid at any angle across another. Among the ancients a piece of wood fastened across a tree or upright post formed a cross, on which were executed criminals of the worst class. It had, therefore, a place similar to that of the modern gallows as an instrument of punishment until, from the crucifixion of Christ, it came to be regarded by Christians with veneration. The Church adopted it as the peculiar symbol of the Christian religion,

and it is still, especially in the Roman Catholic Church, paid peculiar honors.

The cross on which Christ died consisted of a long upright and a shorter crosspiece, the latter fastened on at right angles. This form is the so-called *Latin* cross. The *Greek* cross, represented by the cross of Saint George, has four arms of almost the same length, forming four right angles; in *Saint Andrew's* cross the arms cross obliquely. These two forms are blended together in the British Union Jack. Another form is the *Maltese* cross, with eight pointed ends.

CROSSES

CROSS, Mary Ann or Marian. See Eliot, George.

CROSS'BILL, a species of finch. The two mandibles are so strongly curved that the upper crosses the lower one when the bill is closed. These crossed bills are used with great power to tear pine cones to pieces for the seed which they contain. The crossbills can tear wood readily and soon destroy a wooden cage if confined in it. The male is reddish in color, and the female is of a yellowish-green. But few species are known in the United States, and these are confined almost wholly to the pine forests. One fanciful legend says that the bill of the bird was

AMERICAN CROSSBILL

crossed in trying to draw the nails from the hands of Christ when He was crucified.

CROSS FERTILIZA'TION, fertilization by which the pollen from the stamens of one plant is conveyed to the pistils of another. This is accomplished by the agency of wind and water and by the aid of insects or birds. The effect of this process is that better seeds, that is, those which produce stronger and more fruitful plants, are produced. Botanists have found many special adaptations by means of which cross fertilization is effected. If, for instance, the anther and stigmas become mature at different times on the same plant, it is clear that the stigma can be fertilized only by the pollen of another plant; if the stigma and anthers are so placed that the pollen cannot fall on the stigma, it may fall on some insect which will carry it to another flower; again, in case the stigmas are borne on one plant and the pistils on another, the wind or some other agency must carry the pollen. More complex modes are also common. The stamens of the barberry are very sensitive and when touched by an insect, throw the pollen upon the pistil. Some plants, such as mints, are provided with levers, by means of which the pistil is thrust forward upon the insect previously dusted by the pollen. The pollen is sticky in some plants and adheres to the tongue of the insect. Some plants, like the orchids, are provided with traps, which catch the insects by the limbs and thus force them to scatter the pollen.

Birds, as well as insects, aid flowers in distributing their pollen. Birds that feed on the nectar become dusted with pollen, which in their passage they scatter upon other pistils. Hummingbirds are especially active in performing this service.

The term *cross fertilization* is also used in a general sense and applied in the cases of animals and the human race. A limited amount of cross fertilization, if the environment and other conditions are only slightly changed, is beneficial, but crosses between individuals which are too different in constitution and habits are usually detrimental. Mingling of species too closely related is also usually to the disadvantage of the offspring.

CRO'TON, a genus of plants, either herbs, shrubs or trees, which are widely distributed and bear rather small flowers in terminal clusters. Many species are aromatic, and rich perfumes are made from some, while others yield important medicines. The species which grow in the United States are not especially valuable, but the seeds of a species found in the Philippines yield a powerful oil, prescribed for constipation.

CROTON AQUEDUCT, *kro'ton ak'we dukt,* a system of aqueducts which helps supply New York City people with water. The source of supply is Croton Lake, created by the construction of a dam across the Croton River. The original aqueduct was completed in 1842. It is 38.1 miles long, has a total fall of 43.7 feet, and is constructed of stone, brick and cement. The water is taken across Harlem River in three cast-iron pipes, which are supported on a bridge 100 feet high and about 1,400 feet long. This aqueduct was designed to carry seventy-two million gallons a day, but it was soon found too small to supply the needs of the city. A second aqueduct was completed in 1890, extending from Croton Lake to 135th Street, New York. It is about thirty-one miles long, nearly thirty miles of which are a horse-shoe-shaped tunnel thirteen and a half feet square. The new aqueduct crosses the Harlem River by an inverted siphon, which is 300 feet below the river bed. Its capacity is over 300 million gallons a day. It is connected with the Jerome Park storage reservoir, about twenty-three miles from the dam. For six miles from this point the section is circular and twelve and one-half feet in diameter, having its capacity reduced to 250 million gallons.

Since the Croton aqueduct was completed, the demand for still greater supplies of water for the city led to the building of the Catskill aqueduct. This furnishes 250,000,000 gallons a day, and was completed in 1913. The water is carried nearly a hundred miles, from the Catskill Mountains. Additions to it will increase the supply another 250,000,000 gallons by 1921.

CROUP, *kroop,* a disease, usually attacking children only, which appears in the form of a hoarse cough, accompanied by difficult breathing and the appearance of suffocation. It usually occurs in the night and may be repeated, each attack lasting several hours and terminating in some fever. Sometimes, in the case of ill-nourished or feeble children, the disease is fatal. Inhaling warm vapors of water will often relieve the difficulty, but in severe cases a physician should be called. The child may be given warm milk to drink frequently, and doses of syrup of ipecac to bring on vomiting. The latter should be administered at the rate of a half-teaspoonful every fifteen minutes.

A second variety of the disease is known as *membranous croup,* which is diphtheria of the larynx and is caused by the same bacillus that is active in diphtheria. In *false croup,* as the first species is known, nothing is coughed up, but in membranous croup pieces of membrane are expelled. Death may come from convulsions or from suffocation, though frequently the latter is prevented by the operation known as tracheotomy, in which a tube is inserted into the windpipe below the inflamed tract. Through this tube the patient breathes. Membranous croup demands the attention of a reliable physician. See DIPHTHERIA.

CROW, one of a family of birds containing about 200 species, found in nearly all parts of the world. The American crow is eighteen or nineteen inches in length and has a compact, glossy plumage with some greenish reflections. The crows are social birds that sometimes gather in large flocks, are readily domesticated and sometimes are taught to imitate human speech. They make amusing pets and sometimes show an almost human intelligence, but they are mischievous and seem to take pleasure in annoying people. These birds are bold, thievish and generally unpopular. A tame crow is as great a thief as is a wild one, and will carry off any bright trinket it can find. Opinions vary as to the right of the crow to protection. It surely destroys countless injurious insects, but it uproots newly-planted corn and seeks birds' eggs and young, helpless birds, also the eggs of poultry.

THE CROW

All are birds of strong flight, and all move along the ground by hopping, though most of them can run also. The *fish crow* is a rather small species, very common in the eastern United States. The magpies, jackdaws, rooks, jays and ravens are closely

related species, described under their proper titles.

CROW, a tribe of Indians, now living on a reservation in Montana. Originally a very warlike race, they sided with the whites against the Sioux and often proved of great assistance, especially as scouts. The Crow tribe lived originally in the valley of the Big Horn River. Their women were skilled in the making of ornamented garments. They now number about 1,800.

CROW BLACKBIRD, or **PURPLE GRACKLE**, a large, handsome black bird, found in the eastern parts of America from Southern Canada to the Gulf of Mexico. It is about a foot long, with glossy jet-black color and fine greenish and metallic reflections. West of the Allegheny Mountains its representative is the very similar bronze grackle.

CROWN, a coin, of which the English crown is best known. The latter is equivalent to five English shillings, or about $1.22 in United States money. It was originally made of gold, but since 1551 it has been issued in silver. It bears the imprint of a crown on one side and a likeness of the ruling sovereign on the other. The crown weighs 436.3636 troy grains, of which .925 is pure silver. The name is also used to designate the monetary unit of certain other countries, and these are named in the article COINS, FOREIGN.

CROWN, a symbol of kingly authority, in form circular, to fit the head, made of gold and embellished with precious stones. It is worn on state occasions only. The modern crown is an evolution of the jeweled headdress of Assyrian and Egyptian monarchs. A number of modern crowns are fabulously valuable, particularly some of those belonging to the reigning native princes of British provinces in India. They are set with scores of precious stones. The crown and jewels of the king of England are valued at about $1,000,000.

CROWN POINT, a town in Essex County, N. Y., chiefly important for its historical associations. It was early the site of an English trading post, was settled by the French in 1731, but was destroyed in 1759 by a British attacking party. At the outbreak of the Revolution a body of Green Mountain Boys, under Seth Warner, surprised and captured the garrison, and it was held by the Americans until Burgoyne's invasion in 1777, when it was temporarily abandoned. The ruin of the fortifications erected at this point by the British after 1759, at a cost of more than $10,000,000, may still be seen.

Crown Point is 110 miles northeast of Albany and ten miles from Ticonderoga, on the west shore of Lake Champlain and on the Delaware & Hudson railroad. It has small manufactures of lumber and allied products. Population, 1910, 1,690.

CRUCIFERAE, *kru sif'ur ee*. See MUSTARD FAMILY.

CRUCIFIX'ION, THE (in art). The portrayal of the martyrdom of Christ has been a favorite subject of numerous artists. After the sixth century canvases on this theme became very popular, and it is an interesting fact that the earlier painters usually represented a living Christ with a crown of triumph, while those after the twelfth century depicted the Master as suffering and humiliated. Many other figures are grouped about the cross by the later artists, including the mother of Christ, Mary Magdalene and Saint John. The famous paintings of the Crucifixion include canvases by Fra Angelico, Perugino, Guido Reni, Tintoretto, Dürer, Rubens, Van Dyck and Murillo. See PAINTING.

CRUELTY TO ANIMALS, SOCIETY FOR THE PREVENTION OF. The first society for this purpose was organized in England in 1824, and it was soon influential in securing legislation which provided for the punishment of the beating or otherwise ill-treating of domestic animals, with fine or imprisonment. The first society in the United States was organized in New York in 1866, through the influence of Mr. Henry Bergh, who, during his lifetime, was the most active representative of the society and the idea for which it stood. Through the influence of this organization, legislation has been secured in nearly every state in the Union, fixing a penalty of fine or imprisonment, or both, for abusing domestic animals. Legislation on the subject also regulates transportation of live stock in those sections where stock is carried long distances before reaching market. Railways are now required to unload animals every twenty-four hours and give them rest, feed and water. This humane movement has extended practically to all civilized countries, and in some sections there are laws regulating the treatment of wild animals in captivity.

Henry Bergh (1820–1888) was born in New York City and was educated at Columbia College. Before he began the work for

which his name is universally honored he served in the American legation at the capital of Russia. Bergh also invented artificial pigeons for the sportsman's gun, and was the originator of the plan whereby ambulances are used to carry injured animals away from the streets.

CRUELTY TO CHILDREN, PREVENTION OF, a movement for the protection of children from brutal treatment. The first formal organization in America for child protection was founded in New York in 1875 through the influence of Henry Bergh; others followed rapidly, and at the present time there are more than 350 such societies in the United States. These organizations work for legislation beneficial to children, they help enforce laws already enacted, and they bring before the proper authorities cases of neglect or ill treatment. Many of them include in their activities both the protection of children and of animals.

Some of these societies are financed and controlled by private individuals, and others have official relations with the state authorities. In Europe, Canada and other British colonies similar organizations are found in large numbers.

CRUSADES, *kru saydz'* (from the Latin word meaning *cross*), the wars carried on by the Christian nations of Western Europe, from the eleventh to the thirteenth century, for the conquest of Palestine, and delivery of the Holy Land from the infidel Turks. They were given the name of Crusaders because the warriors wore the sign of the Cross. The antagonism between the Christian and Mohammedan nations had been intensified by the treatment the Turks accorded pilgrims to Jerusalem; and the first strenuous appeal to wrest the Holy Land was assured of response alike from the pious, the adventurous and the greedy.

The First Crusade. The immediate cause of the first Crusade was the preaching of Peter the Hermit, who had joined other pilgrims on a journey to Jerusalem. On his return he gave Pope Urban II a description of the unhappy situation of Christians in the East and presented a petition for assistance from the patriarch of Jerusalem. The statements of the pope at the Council of Clermont in 1095 produced a profound sensation throughout Europe, and in 1096 several armies set out in different divisions. Most of these earliest crusaders, ignorant as they were of military discipline and not provided with sufficient food, perished before reaching Constantinople, which had been chosen for their place of meeting. A well-conducted regular army, however, of almost one hundred thousand knights, was headed by such men as Godfrey of Bouillon; Baldwin, brother of Godfrey; Robert of Flanders; Robert of Normandy, brother of William II, king of England; Raymond of Toulouse, and other heroes. They traversed Germany, Hungary and the Byzantine Empire, passed over into Asia Minor, conquered Nicaea in 1097, and shortly after fought the first pitched battle at Dorylaeum, winning a complete victory after a severe contest. They then marched upon Antioch, which fell into their hands in June, 1098. Surrounded in turn by a Turkish army, they were soon reduced to pitiable straits but succeeded in routing their besiegers, and after remaining nearly a year in the neighborhood of Antioch they began their march against Jerusalem. Their numbers were now reduced to little more than twenty thousand men; but after a fierce struggle the town was taken by storm (1099) and Godfrey of Bouillon was chosen ruler of the city (See Godfrey de Bouillon).

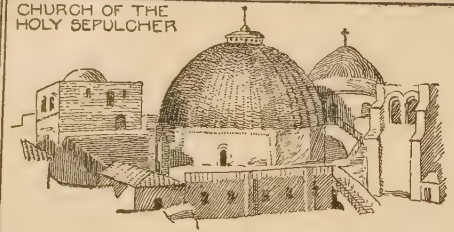
The Second Crusade (1147–1149) was occasioned by the loss of Edessa, which had been taken by the Christians in the First Crusade. Fearing still graver losses, the pope, seconded by Bernard of Clairvaux, exhorted the German emperor Conrad III, and the king of France, Louis VII, to defend the cross. Both these monarchs obeyed and led large forces to the East, but returned without accomplishing anything.

The Third Crusade was undertaken after the capture of Jerusalem by Saladin in 1187, the monarchs Frederick Barbarossa of Germany, Philip Augustus of France and Richard I of England, leading their armies in person. Richard and Philip Augustus agreed to unite their forces at Messina in Sicily, where they spent six months at the end of 1190 and beginning of 1191. Jealousies arose, however, between the monarchs, and within a few weeks after the fall of Acre the French king returned to Europe. Richard, now sole leader of the expedition, defeated Saladin; but having twice vainly set out with the design of besieging Jerusalem, he finally concluded a truce of three years and three months with Saladin, who agreed that pilgrims should be free to visit the Holy Sepulcher, and that the whole seacoast from Tyre to Jaffa should belong to the Crusaders.

The Fourth Crusade was set on foot by Pope Innocent III in 1202. Among its chief promoters were Geoffrey of Villehardouin, Baldwin of Flanders and the marquis of Montferrat, who was chosen leader. The

THE CRUSADES

CHURCH OF THE HOLY SEPULCHER



LANDING OF ST LOUIS

THE SPIRIT OF THE CRUSADES

A PILGRIM AT A SHRINE ON THE ROUTE

SUMMARY

Beginning of First Crusade	1096
Capture of Jerusalem	1099
Beginning of Second Crusade	1147
Beginning of Third Crusade	1189
Fourth Crusade Begun by Knights of St John	1195
Beginning of Fifth Crusade	1201
Children's Crusade	1212
Beginning of Sixth Crusade	1217
Seventh Crusade preached by Pope Gregory II	1238
Eighth Crusade undertaken by St. Louis	1246
Ninth Crusade	1267

PETER THE HERMIT

THE CRUSADES
+++ 1096-99, FIRST CRUSADE
---1147-49, SECOND CRUSADE.
-·-1189-91, THIRD CRUSADE

RICHARD "THE LION-HEARTED" AS A CRUSADER

Crusaders assembled at Venice in the spring, but were diverted from their original purpose, first by the capture of the Dalmatian town of Zara, and then by the expedition which ended in the sack of Constantinople and the establishment of a Latin empire there (1204).

The Fifth Crusade (1228–1229), that of Frederick II, emperor of Germany, was undertaken in fulfilment of a vow. Frederick entered into negotiations with the sultan of Egypt, and without any fighting gained possession of the kingdom of Judea on the condition of tolerating in his kingdom the Mohammedan worship. He then concluded a useless truce of ten years and was crowned at Jerusalem.

The Sixth (1248–1254) **and Seventh** (1270) **Crusades** were led by Louis IX of France. In the first of these expeditions he took Damietta and marched up the Nile, but was compelled to retreat and finally to surrender with his whole army. He was released only on payment of a large ransom. The second expedition was still more disastrous in its results than the first. He landed his army on the northern coast of Africa, but he himself and a large number of his knights died before Tunis. A crusading army under Prince Edward of England (later Edward I), originally intended to coöperate with that of Louis, landed at Acre in 1271, but little was effected beyond a new truce for ten years.

The Children's Crusade. Authorities do not all agree as to the numbering of these Crusades, as there were in the intervals between the greater movements constant minor expeditions. Most remarkable of these lesser crusades was the Children's Crusade in 1212. It is believed that about fifty thousand boys and girls took part in this movement. A band of German children marched south to the Mediterranean and although thousands of them died of privation by the way, the remainder pressed on, confident that a way would be opened to them through the sea. When their hopes proved false, some of them remained in Genoa and some attempted to return to Germany, but few of them ever arrived at home. The French children gathered at Marseilles, and two merchants managed to entice them on board ship, with the promise of free transportation to the Holy Land. Two of the ships were wrecked and the children on the others were sold in Alexandria as slaves.

Despite the fact that the Crusades failed entirely in their real object, they were of inestimable importance in European history for many reasons. The European nations became better acquainted with one another; the power of the Church was materially increased; the citizen class gained much influence, partly because the nobility suffered by extravagant contributions to the Crusades, and partly because the enlarged commercial intercourse greatly augmented the wealth of the cities. Another important political result of the Crusades was the growth of the royal power at the expense of that of the nobles. Intellectually the Crusades were of the utmost value, because they brought to the notice of Europeans the civilization of the Saracens, which was much higher in many respects than that of any of the western nations.

CRUSTACEA, *krus ta'she ah,* the highest group of jointed animals. There are about 10,000 living species, the majority of them being sea animals, though a few are found upon the earth or in stagnant or running fresh waters. The smaller ones are an important source of food to other marine animals, while some of the larger types are among the favorite sea foods of all nations. Crustaceans have five pairs of appendages on the head, and all of their limbs excepting the first pair are forked. The entire body is covered with a hard coating, which in some forms is almost bonelike, but in others is merely tough and leathery. The animals lay eggs, which are almost always hatched in water, though some of the land species carry the eggs and young on the under side of the abdomen. As the animal grows its skin becomes confining at intervals, and so it is cast off, together with the shell which it has secreted.

Related Articles. Consult the following titles for additional information:
Arthropoda
Barnacle
Crab
Lobster
Shrimp
Zoölogy

CRY'OLITE, or **KRY'OLITE**, a mineral, a native fluoride of aluminum and sodium, found at Evigtok, in Greenland, whence it is exported. It is of a pale grayish-white or yellowish-brown color, with a glassy lustre, and occurs in masses of thin layers folded upon one another. It has been employed as a source of aluminum, and in the manufacture of a hard, porcelainlike glass of great beauty.

CRYPT, *kript,* a vault under a church, designed originally to receive the bodies of the saints and martyrs. It developed out of the *confession* and became enlarged so as to contain the altar and a room to worship relics. It generally occupied the space below the transept, choir and apse. From the ninth to the thirteenth century the crypt formed an important feature of church architecture, particularly in the Romanesque style. One of the famous examples is that under the

Glasgow Cathedral, and others are found in the cathedrals of Canterbury, Gloucester and Saint Mark's and in the Church of Saint Peter's. See ALTAR.

CRYPTOGAMOUS, PLANTS, or **CRYPTOGAMS,** *krip toh' ga mus, krip' toh-gamz,* a term that includes all plants which do not bear seeds. In contrast with these, the seed-bearing plants are often called phanerogams. See BOTANY.

CRYSTALLINE, *kris'tal line,* or *kris'tal-lin,* **LENS.** See EYE.

CRYSTALLINE ROCKS, rocks formed by crystallization, such as granite, believed to have acquired this character by the action of heat and pressure. See IGNEOUS ROCKS.

CRYSTALLIZATION, *kris tal i za'shun,* a method of formation peculiar to many solid substances, whereby they are formed into masses of crystals. The forms thus produced are numbered by the thousands, but these can all be classified under six systems, as follows:

1. The Regular Cubic System. Crystals of this system have three lines or axes of equal length, crossing each other at the middle point at right angles. The ends of the axes lie in the center of the respective planes of the crystal. The regular crystals of this system are cubical. Common salt, iron pyrites, galena or lead sulphide, silver, copper and gold are examples of substances crystallizing on this plan.

2. The Square Prismatic System. In this system the axes are at right angles to each other, but one may be longer than the other two. The short axes may terminate in the middle of the planes of the crystal or at the edges of these planes, and the long axis may terminate in a point where all the faces meet. This arrangement forms a pyramid, or the crystal may have the form of two pyramids, with their bases together. Binoxide of tin, calomel and yellow prussiate of potash are common examples of this form of crystals.

3. The Right Prismatic System. In this the three axes are all of unequal length, but are placed at right angles to each other. The crystals belonging to this system are of the form of right rhombic prisms and rhombic-based octahedrons. Sulphate of Potash, sulphur, nitrate of potash and topaz crystallize on this plan.

4. The Oblique Prismatic System, in which two of the axes are placed at right angles to each other, while the third is inclined. The axes may all be of different lengths. The crystals take the form of oblique prisms. Borax, copperas (sulphate of iron), sulphate of soda and carbonate of soda (sal soda) are common examples.

5. The Double Oblique Prismatic System. A crystal in this plan has three axes of unequal length, intersecting obliquely with each other. The crystals of this system are often irregular and difficult to classify. Blue vitriol (sulphate of copper), sulphate of manganese and some forms of tartaric acid crystallize according to this plan.

6. The Hexagonal Rhombohedral System. This system has four axes, three of which are in the same plane and inclined to each other at an angle of sixty degrees, while the fourth is perpendicular to them. This system gives a regular six-sided prism. Many varieties of limestone crystallize according to this plan, and some of the crystals are so minute that they cannot be seen without a microscope. Quartz, ice, snowflakes and calcite also crystallize in this system.

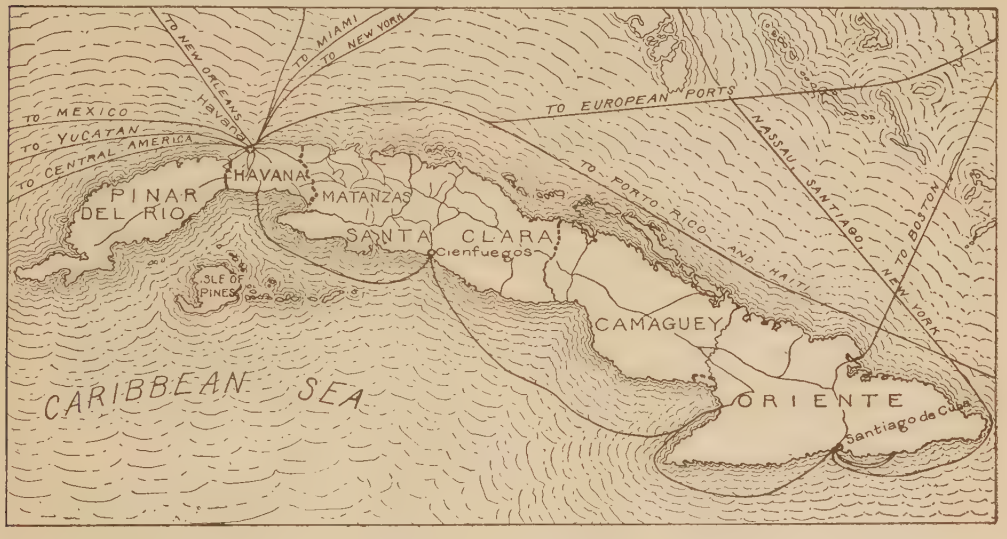
CUBA, *ku'ba,* the "Pearl of the Antilles," a long, narrow island, the largest and most important of the West Indies group. With the Isle of Pines, which lies to the south, and several smaller and unimportant islets, it forms the republic of Cuba.

The center of Cuba from east to west is considerably east of the southern coast of Florida. From Florida Keys across the straits of Florida the distance to the island is 110 miles. Havana is in almost the same longitude as Detroit, Michigan, and is 200 miles west of the longitude of Panama. The area of the island is 44,164 square miles; the republic is therefore nearly as large as Pennsylvania. Its total length is 730 miles, and its greatest width is fifty miles. The coast line measures 2,500 miles.

The People. The population of the island in 1916 was 2,672,536. Nearly two-thirds of the inhabitants are native Cubans; about 185,000 were born in Spain, and the remainder are largely Americans, negroes, and Chinamen. The negroes are most thickly settled in Oriente, where 43 per cent of the people are black; they are least numerous in Camagüey, where they are but 18 per cent of the population. Because Spain owned the island from its discovery until 1898 the official language is Spanish, but English is gaining remarkable headway. When independence was secured 59 per cent of the Cubans over ten years of age were illiterate. Eight years later the native illiteracy had been reduced to 43 per cent, during

the time when new educational facilities were not yet fully established. The religion is very largely Roman Catholic. The University of Havana is at the head of the system of education. One good secondary school is maintained by the government in each of the six provinces, and there are nearly 3,000 free public schools.

Surface and Drainage. The Copper Mountains traverse the island from east to west and form a low watershed, varying from 110 to 400 feet in altitude. The highest peak is Pico Torquinos, which has an altitude of 8,320 feet. From each side of the watershed the surface slopes gradually to the coast, forming undulating, well-watered plains,



THE ISLAND OF CUBA

covered with luxuriant forests and plantations. Numerous lagoons and salt marshes occur in the lowlands along the coast. The irregularity of the coast line provides a number of good harbors, but in many places the coast is low and rocky and the water is shallow.

The island has about 200 streams large enough to be called rivers, but they are all short, and only a few are navigable. The Rio Canto, which is the largest, admits of the passage of boats for sixty miles. There are only a few small lakes, but the large salt water lagoons on the north side resemble lakes.

Climate. Cuba has a tropical climate. The mean annual temperature is 78°, and the maximum seldom exceeds 88°. July and August are the hottest months. The average annual rainfall at Havana is sixty inches, and, with few exceptions, the entire island has an abundance of rain for all agricultural purposes; in some sections it reaches 100 inches. Only a few small areas in the interior require irrigation. In the highlands the climate is generally healthful, but in the lowlands much sickness prevails, although recent experience seems to indicate that this is due more to the unsanitary condition of the country than to the climate.

Mineral Resources. Deposits of coal, copper, gold, silver, and iron are found particularly in the district surrounding Santiago de Cuba. Copper has been mined in the mountains with profit, and iron ore is shipped from Santiago to the United States, the annual shipment amounting to about 600,000 tons. Asphalt is obtained in the Bay of Cardenas, and considerable salt is procured in other localities. The other mineral deposits are not of sufficient extent to warrant working.

Agriculture. The island is covered with a luxuriant growth of vegetation. Flowers, grasses and many varieties of herbaceous plants are found on the lowlands, while the mountains to their summits are clothed with heavy forests, containing mahogany, ebony, rosewood, granadilla, cedar, live-oak and other valuable timber.

The soil and climate are favorable to agriculture, which is the leading industry. Pre-

vious to the last war for independence, the country contained over 90,000 plantations, farms, cattle ranches and orchards. During the war many of these were devastated, but since the establishment of an independent government agriculture has been rapidly advancing. Sugar, tobacco, coffee and tropical fruits are the leading products. Of these sugar is the most important; it was once predicted that when all of the land suitable

A SCENE IN RURAL CUBA

for growing sugar cane should be brought under cultivation, an annual crop of a half million tons of sugar could be produced. In reality, the sugar needs of the world have stirred Cuban planters to extraordinary endeavors. The average annual production for several years preceding 1919 was almost 3,000,000 tons; in 1918 it was 3,300,000 tons. The chief provinces devoted to sugar cane are Santa Clara and Matanzas.

Tobacco is second only to sugar in importance, and a large revenue is derived from its growth and manufacture. Cuban tobacco maintains a standard value in all markets, on account of its excellent flavor, and the province of Pinar del Rio is the most important tobacco producing region in the world. Cattle raising is an important industry, and large areas are given to the growing of vegetables, corn and poultry. Bee keeping is also successful.

The manufactures are practically confined to cigars and other products of tobacco and to the manufacture of raw sugar.

Transportation and Commerce. Roads are generally poor, and lack of good means of transportation in the interior is a great hindrance to commerce. Havana is connected with Pinar del Rio, Matanzas, Cabanas, La Isabella, Camagüey, Santiago de Cuba, Manzanillo and Cienfuegos by railway. A line of railway extends across the island from Moron to Jucaro, and another connects Camagüey with the port of Neuvetas. In all, there are about 2,360 miles of railway, some of which is in poor condition.

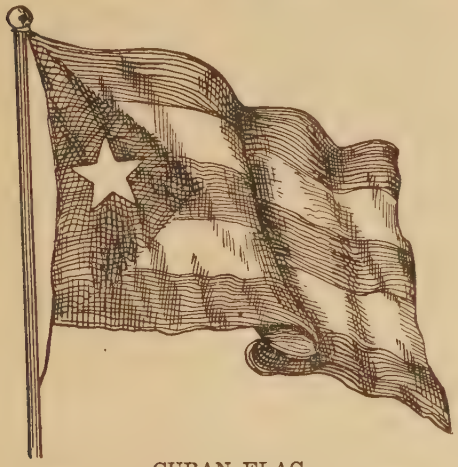
The irregularity of the coast provides numerous good harbors, about forty being accessible to ocean-going vessels. Havana, Matanzas, Cabanas, Cienfuegos and Santiago de Cuba are the important seaports. Regular communication is maintained with the Atlantic and Gulf ports of the United States and with the commercial centers of Europe. In 1918 a new line was established between Cuban and Spanish ports. Cuba is situated at the convergence of many transatlantic routes, and the ships of all nations find their way into the harbor of Havana, the principal seaport. The commerce of the island is rapidly growing. The foreign trade is largely with the United States.

Government. Cuba is governed in accordance with the Constitution adopted by a representative convention, February 21, 1901. The government is republican in form and differs but slightly from that of the United States. The head of the administration is the President, who must be a native Cuban or a naturalized citizen who served ten years in the Cuban army during the wars for independence. He is elected by popular vote for a term of four years and cannot serve more than two consecutive terms. He appoints and removes members of his Cabinet, who are responsible to him for the administration of their departments. The legislative power is vested in a Congress, consisting of two houses, a Senate and a House of Representatives. The former contains four Senators from each of the six provinces. The House of Representatives consists of one member for every twenty-five thousand inhabitants or fraction thereof more than 12,500. In 1918 the increase in population added seven Representatives, bringing the total to 121. They are elected for four years, one-half retiring every two years. Congress holds annual sessions, controls the financial and foreign affairs of the republic and makes general laws for the administration of the government, as well as of some phases of provincial government.

The island is divided into six provinces: Havana, Matanzas, Pinar del Rio, Camagüey, Santa Clara and Oriente. Each province has a governor and an assembly, both elected by the people for a period of three

years. There is a supreme court for the interpretation of the Constitution, its judges being appointed by the president with the approval of the Senate. Every male Cuban over twenty-one years of age and not mentally incapacitated or convicted of crime, all Spanish residents who have been on the island since April 11, 1899, and all foreigners who have resided there since January, 1, 1899, are entitled to franchise. Foreigners who have taken up their residence there since January 1, 1899, are required to show five years' residence for naturalization.

History. Cuba was discovered by Columbus in 1492. It was settled in 1511 by Diego Columbus, son of Christopher, who founded Santiago in 1514, and in 1519 the present city of Havana was established. This settlement soon became the foremost town in the island and the center of government. In spite of the typically cruel government exercised from the first, the colony remained until 1898 the "Ever-Faithful Isle."



CUBAN FLAG
The triangular field is red; the stripes are alternately blue and white.

The Spaniards reduced the natives to slavery and treated them so cruelly that by the middle of the sixteenth century the race was almost extinct. This required the introduction of negroes from Africa, and they were employed so constantly and under such terrible conditions that mortality among them was greater than increase, and the government was compelled to import constantly increasing numbers. Havana was destroyed by the French in 1534 and again in 1554 and was captured by the Dutch in 1624, but it was immediately restored and thereafter was repeatedly the prey of filibusters and pirates.

During the eighteenth century, Cuba was exploited by a line of vicious and oppressive governor-generals but after the Seven Years' War, during which England had captured the island only to return it to Spain in 1763, prosperity ruled and the resources of Cuba were developed. Still, unscrupulous governor-generals were enabled to repress its natural progress by exacting enormous taxes and vast sums in tribute. The island was attractive to American statesmen, especially those of the South, as a field for the extension of slavery, and it was the secret ambition of many Presidents to gain control of it by purchase. Finally, in 1848, President Polk offered $100,000,000 to Spain, but it was refused. In 1854, eminent American ministers to Great Britain, France and Spain, among whom was James Buchanan, united in drawing up the Ostend Manifesto (which see), which urged the United States to annex Cuba by force if Spain refused to sell. Nothing came of these efforts.

Meantime, the people of Cuba were striving to abolish slavery and to gain their independence. Many insurrections occurred, notably those of 1849 and 1854, which, though causing great suffering, accomplished little. Finally, in 1868, began a ten years' struggle which extorted from the Spanish government the promise of liberal government, representation in the Spanish parliament and the encouragement of industry. These promises were but partly kept, however, and discontent increased until 1895, when the last great rebellion broke out. Spain sent General Campos to the island to suppress the rebellion, but the insurgents under Gomez, Maceo and Garcia continued to gain successes and by guerrilla warfare completely checked the efforts of the Spanish soldiery to pacify the island. Campos was succeeded by Weyler, who undertook such savage measures that sympathy was aroused for the Cubans throughout the world and especially in the United States. Weyler was superseded by Blanco in 1897, and in spite of the promise of autonomy the insurrection continued and seemed to gain strength in the following winter.

Cuba meantime had frequently requested the United States to interfere in its behalf, and the time seemed opportune for such interference when an American warship, the *Maine,* was destroyed in Havana harbor, Feb-

ruary 15, 1898, by some mysterious cause which the American people believed to be known to Spain. In April of that year Congress declared that "the people of Cuba are and of right ought to be free and independent." War was declared against Spain, and in a brief conflict American arms were triumphant everywhere. By the Treaty of Paris, December 10, 1898, Spain relinquished all sovereignty over Cuba.

The United States temporarily occupied the island. A constitutional convention was called in 1901, and a Constitution was adopted, including a special amendment, known as the Platt Amendment, proposed by the Congress of the United States, to guarantee that the government should never enter into any treaty with a foreign power which would impair the independence of the island; that it should not assume any debt for whose payment it could not provide; that the United States could interfere to preserve the independence of the island or to protect life, property or individual liberty; that the United States be given certain coaling and naval stations. In December, 1901 the first President was elected, in the person of Tomas Estrada Palma, and on May 20, 1902, the United States formally withdrew.

In 1906 an insurrection broke out, headed by a defeated candidate for president. The Cuban army was powerless and social order in some provinces was almost destroyed. The United States therefore intervened and sent a commission, headed by Hon. W. H. Taft, Secretary of War, to the island. This commission tried to reconcile the opposing factions, but without success. President Palma resigned and the Cuban Congress failed to elect a successor. Thereupon Secretary Taft issued a proclamation placing the republic under military government, and under the control of the United States order was immediately restored. The United States government in again assuming control of the island made it very plain that the control would continue only until the people of Cuba were again in condition to proceed peaceably with a new election, and the government could be transferred to the officers thus chosen. A national election was held November 14, 1908, and Gen. José Miguel Gomez was chosen President. On January 13, 1909, President Gomez was inaugurated. On January 13 the United States troops began to withdraw, and in April the last detachment departed, leaving the Cuban republic again under control of its own government.

Trouble occurred again over the elections of November, 1916, when M. G. Menocal, the Conservative candidate, was chosen President. The opposition party, under the leadership of ex-President Gomez, revolted, and in February, 1917, seized Santiago de Cuba and the city of Oriente. In March Commander Belknap, head of American naval affairs at Santiago, landed 400 American marines to protect American interests and to support the Cuban government in the reëstablishment of order. The revolt subsided and Menocal took the oath of office on May 20.

When the United States declared war on Germany on April 6, 1917, and placed its power at the disposal of the entente allies, little Cuba—not that its help would turn the scale of battle or even weigh appreciably in physical way—also declared a state of war to exist between that country and Germany. On the day war was declared by Cuba—April 8,—the little republic gave moral support and sympathy to the great nation whose unselfishness it had itself witnessed. In 1918 the fourth day of July was made a yearly national holiday.

Related Articles. Consult the following titles for additional information:

Camagüey	Isle of Pines
Cienfuegos	Matanzas
Garcia y Iniguez	Palma Tomas, E.
Gomez y Baez, M.	Santiago de Cuba
Havana	Spanish-American War

CUBE, a geometric solid having six equal square faces. A cube is used as a unit of measure for volume. One *cubic inch* is a volume equivalent to a cube one inch in each of its dimensions. The volume of a cube is equal to its height a, times its width a, times its length a, or a^3. From this circumstance the third power of a number, which is the product of a number taken three times as a factor, is called its cube. One of the famous mathematical problems of antiquity was that of the "duplication of the cube;" that is, to find a cube whose volume is twice that of a given cube. It is impossible of solution by the processes of elementary mathematics. See CUBIC MEASURE.

CU'BEBS, the fruit of species of plants belonging to the pepper family. The cubebs of pharmacy are produced by a climbing woody shrub, a native of the East Indies. It has round, ash-colored, smooth branches, each of which bears from forty to fifty small,

globose fruits, about one-fifth of an inch in diameter. The odor of cubebs is agreeable and aromatic; the taste, pungent, acrid and slightly bitterish. It is used by the natives for flavoring, but in other countries chiefly in medicine, as an astringent and in cases of indigestion and catarrh.

CUBE ROOT, the process of resolving a number into three equal factors, or of finding the length of one edge of a cube.

The radical sign ($\sqrt[3]{\ }$) with the small figure 3 over it denotes that the cube root of the number over which it stands is to be extracted. Thus, $\sqrt[3]{1728}=12$.

The cube of a number is the product of the number used three times as a factor.

The cube root is one of the three equal factors.

The cube of a number having two places of figures consists of the cube of the tens, plus three times the product of the square of the tens by the units, plus the product of three times the tens by the square of the units ,plus the cube of the units. The formula may be expressed algebraically by the cube of the quantity $t + u$, in which t represents the tens and u the units. $(t + u)^3 = t^3+3(t^2\times u)+3(t\times u^2)+u^3$.

The following multiplication, expressed by an algebraic formula, shows how this result is obtained:

$$\begin{array}{l} t+u \\ t+u \\ \hline t^2+tu \\ \quad\ tu+u^2 \\ \hline t^2+2tu+u^2 \\ t+u \\ \hline t^3+2t^2u+tu^2 \\ \quad\ t^2u+2tu^2+u^3 \\ \hline t^3+3t^2u+3tu^2+u^3 \end{array}$$

A similar result in figures may be obtained by taking any number of two places, as 48, and cubing it, as you would a literal quantity in algebra. This may at first glance appear difficult to young pupils, but a careful study of the following will clear it up:

$$\begin{array}{l} 48=40+8 \\ (40+8)^3=40^3+3(40^2\times 8)+3(40\times 8^2)+8^3 \\ 40+8 \\ 40+8 \\ \hline 40^2+(40\times 8) \\ \quad\ (40\times 8)+8^2 \\ \hline 40^2+2(40\times 8)+8^2 \\ 40+8 \\ \hline 40^3+2(40^2\times 8)+(40\times 8^2) \\ \quad\ (40^2\times 8)+2(40\times 8^2)+8^3 \\ \hline 40^3+3(40^2\times 8)+3(40\times 8^2)+8^3 \end{array}$$

$$\begin{array}{rl} 40^3 & = 64'000 \\ 3(40^2\times 8) & = 38,400 \\ 3(40\times 8^2) & = 7,680 \\ 8^3 & = 512 \\ \hline 48^3 & = 110,592 \end{array}$$

In extracting the cube root of a number we take the number apart, as it were, so as to show the three equal factors. The process is therefore the reverse of finding the cube of the number. Students of arithmetic usually find the geometric or block method the most satisfactory in explaining the process. In the diagrams, Figure 1 represents 40^3 and has a content of 64,000 cubic units; Figure 2 represents $3(40^2\times 8)$ and the contents of these three blocks are 38,400 cubic units; Figure 3 represents $3(40\times 8^2)$ and the contents of these blocks are 7,680 cubic units; Figure 4 represents 8^3 or 512 cubic units.

In extracting the cube root of 110,592, we

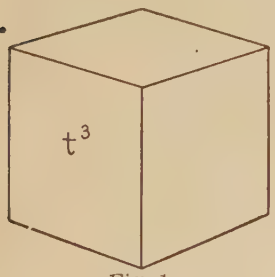


Fig. 1

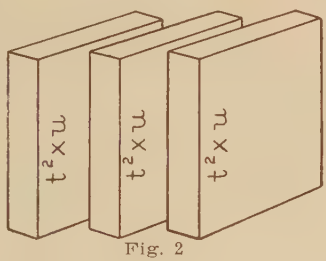


Fig. 2

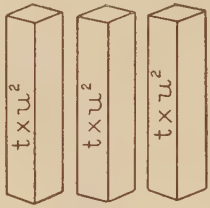


Fig. 3

Fig. 4

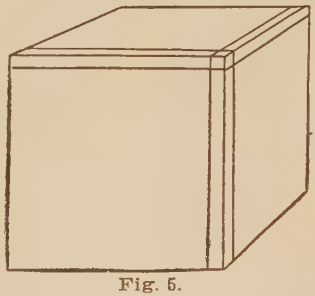


Fig. 5.

use 40 as the first divisor, since by inspection we see that it is the largest number whose cube is contained in 110,000, the first period.

PROCESS

$$\begin{array}{rl} & 110'\,592 \mid 40+8 \\ & 64\ 000 \\ \hline 3\times 40^2=4800 & 46\ 592 \\ 3\times 40\times 8=\ 960 & \\ 8^2=\ 64 & \\ \hline 5824 & 46\ 592 \end{array}$$

After subtracting 64,000, the cube of 40, we have a remainder of 46,592, which represents

the quantity in the unused portion of the formula— $3(40^2\times8)+3(4\times8^2)+8^3$.

Since we know the tens figure in the root to be 4, we use three times the square of the tens as a trial divisor to find the units. When this figure is found we add to the trial divisor the remainder of the formula, $3(40\times8)+8^2$, and multiply the sum of these additions and the trial divisor by 8, the result being 46,592.

Figure 1 represents a cube the length of whose respective edges is 40 units; figure 5 represents the cube after the additions shown in figures 1, 2 and 3 have been made, and its respective edges have a length of 48 units.

CUBIC MEASURE teaches the process by which to ascertain the volume of bodies which are solids, having the three dimensions of length, breadth and thickness. The volume of a solid whose sides are regular is found by multiplying together the numbers representing its three sides. The arithmetical table relating to solids is given below:

1 cubic foot=1728 cubic inches
1 cubic yard=27 cubic feet
1 gallon=231 cubic inches
1 bushel=2150.4 cubic inches

Each of the figures above, as 1728 cubic inches, was found by multiplying a related number by itself three times. A cubic foot is a regular solid 12 inches in length, 12 inches in breadth and 12 inches in thickness; its volume equals $12\times12\times12$ inches, or 1728 cubic inches. To find the side of a cube which will contain one gallon, or one bushel, extract the cube root of the number which represents its volume (see CUBE ROOT).

Under the heading Mensuration will be found many exercises in measurements. See, also, Arithmetic.

CUBIST SCHOOL OF PAINTING, a school of art in which the idea conveyed by the artist is expressed through cubes, triangles and other geometrical figures. The principle upon which the Cubist works may be expressed thus:

"He takes the elements of expression from the forms and colors of nature and uses them not to represent objects but to produce an organism which will contain in terms of art what a given subject means to him in terms of sensation."

The result is a picture which suggests but does not reproduce and which may be called an exaggerated impressionistic creation. The Cubists, who came into prominence in 1913, went to all manner of extremes in working out this peculiar theory, producing some manifest absurdities, but also some pictures of real value. It was generally agreed that they were too radical to establish a permanent school of art, but that they rendered art a valuable service in arousing a new interest in the subject of painting. The founder and leader of the movement is Paul Picasso, who painted the much-discussed, *The Woman with the Mustard Pot.* Other pictures that were subject to considerable comment included Marcel Duchamp's *Nude Descending a Staircase* and Francis Picabia's *The Dance at the Spring.*

CU'BIT, a measure of length frequently mentioned in the Bible, and in common use among the ancients. The cubit of the Hebrews was equal to 17.58 inches, English measure, and that of the Romans, about 17.4 inches. The word is from the Latin for *elbow,* as originally the cubit was supposed to be the distance from the elbow to the end of the middle finger.

CUCK'OO, a bird common in warm countries and a summer resident in more northern lands. Altogether there are nearly 200 species known. In the United States the rain crow or yellow-billed cuckoo is com-

CUCKOO

mon, but it is a shy bird, keeping in the woods and flitting about quietly, uttering hoarse chucking notes which people used to say foretold rain. It is a long, slender bird of

a pretty greenish-brown color, and builds its flimsy nest and rears its own young. The European cuckoo, however, lays its small egg upon the ground and then picks it up and deposits it in the nest of a smaller bird, where it is cared for by the unwilling mother (see COWBIRD). The song of this bird, which gave it its name, is much sweeter than that of the American species. The cockoo of Africa and Asia is closely allied to the European cuckoo.

CUCUMBER, *ku'kum ber*, the familiar fruit of a vine which is closely related to the muskmelon, and which was introduced to the world from the East Indies. In Southern Europe it is cooked before being used as an article of food, but in the United States it is used principally as salad or pickle. The varieties are numerous, and each has its particular value. In a wild state in tropical Asia, the cucumber is very bitter and almost poisonous; even now it occasionally happens that a fruit is found that is bitter throughout, and almost always near the stem there is a bitter section.

CU'FIC, or **KU'FIC**, a term derived from the town of Cufa, in the territory of Bagdad, applied to the written characters of the Arabian alphabet, in use from about the sixth century of the Christian Era until about the eleventh. The earliest copies of the *Koran* were written in these characters.

CULLOM, SHELBY MOORE (1829–1914), an American statesman, born in Wayne County, Ky. He was admitted to the bar in Illinois and began his practice in Springfield, where he was soon elected to the legislature; from there he was sent to Congress. From 1876 to 1883 he was governor of Illinois, in the latter year beginning a career of thirty years in the United States Senate as a Republican. He was one of the framers of the interstate commerce law of 1889, and was one of the commissioners to establish American government in Hawaii. In 1913 he was appointed commissioner in charge of the great Lincoln Memorial at Washington, D. C. Cullom was a friend of Lincoln, and in his later years looked much like the great President.

CUMBERLAND, MD., the county seat of Allegany County, 152 miles northwest of Washington, on the Potomac River and the Chesapeake & Ohio Canal and on the Baltimore & Ohio, the Cumberland & Pennsylvania and the Western Maryland railroads. It is the trade center of the Cumberland and Georges Creek coal district, and in population and importance is the second city of the state. The industries include manufactories of railroad material, glass works, tanneries, flour mills, steel and iron works and railroad repair shops. The place was laid out in 1785 on the site of Fort Cumberland, which was erected at the outbreak of the French and Indian War. Cumberland was incorporated as a city in 1850. It adopted the commission form of government in 1909. Population, 1910, 21,839; in 1917, 26,686 (Federal estimate).

CUMBERLAND MOUNTAINS, a part of the Appalachian system. The several ridges of these mountains extend from West Virginia along the boundary of Virginia and Kentucky, across Tennessee into Alabama, and form a plateau about fifty miles wide. They rarely exceed 2,000 feet in height. They are covered with good timber, but the soil is not very rich. The famous Cumberland Gap, once a gateway to regions farther west, lies at the place where Tennessee, Virginia and Kentucky meet. See APPALACHIAN MOUNTAINS.

CUMBERLAND RIVER, a river which rises in Kentucky in the Cumberland Mountains, flows nearly westward into Tennessee, where it makes almost a semicircle, returns into Kentucky and finally empties into the Ohio at Smithland. It is about 680 miles long, and is navigable for steamboats to Nashville, nearly 200 miles from its mouth.

CUMBERLAND ROAD, a road constructed by the United States government, extending from Fort Cumberland, Md., to Vandalia, Ill., a distance of 800 miles. It was begun about 1806 and was finished about 1840. It was for years under Federal control and was commonly called the Great National Pike, but by 1856 each state through which it passed was controlling the section within its borders. It played an important part in opening the West to settlement and was for years the chief avenue of westward migration. Henry Clay was one of the most zealous advocates of the enterprise.

CUMMINS, ALBERT BAIRD (1850–), an American lawyer and statesman, identified with the progressive wing of the Republican party. Cummins was born at Carmichaels, Pa. He practiced law in Chicago from 1875 to 1878, when he removed to Des Moines, Iowa. There he became prominent

in Republican politics, and from 1902 to 1908 was governor of the state, serving three terms. He achieved fame as an earnest advocate of tariff revision by the Republican party, a policy known for a time as the "Iowa idea." In 1908, on the death of Senator Allison, Cummins became United States Senator; at the election in 1909 he was reelected for the full term, and was again elected for the term ending in 1921. He was prominently mentioned as a candidate for the Vice-Presidency on the Republican ticket in 1908, and in 1912 was an active candidate for the nomination for President.

CUNEIFORM, INSCRIPTIONS, *ku ne'i form,* the name applied to the wedge-shaped characters of the inscriptions on old Babylonian and Persian monuments, sometimes also described as arrow-headed or nail-headed characters. These characters appear to have been originally of the nature of hieroglyphs and to have been invented by the primitive Accadian inhabitants of Chaldea. From the Chaldeans they were borrowed, with considerable modification, by the conquering Babylonians and Assyrians, who were Semites by race and spoke an entirely different language. The use of the cuneiform characters, however, ceased shortly after the reign of Alexander the Great; and after the lapse of nearly 2,000 years it was doubted by many if the signs had ever had an intelligible meaning. They were even regarded by some as the work of a species of worm, by others as mere talismanic signs or astrological symbols. Gradually, however, through the efforts of Grotefend, Lassen, Rawlinson and other investigators, the means of translation were perfected.

Many of the inscriptions first discovered are in three different languages and in as many varieties of cuneiform writing. The most prominent, and at the same time the simplest and latest of these, is the Persian, with about sixty letters. Next older in time and much more complex is what is designated as the Assyrian or Babylonian system of writing, consisting of from 600 to 700 characters, partly alphabetic, partly syllabic. Lastly comes the Accadian inscriptions, the oldest of all, originally proceeding from a people who had reached a high state of civilization 3,000 years before Christ and whose language ceased to be a living tongue about 1700 B. C. The most celebrated trilingual inscription is that at Behistun, cut upon the face of a rock 1,700 feet high, recording a portion of the history of Darius. The British Museum contains many thousands of inscribed clay tablets, cylinders, prisms and the like, the decipherment of which is still in progress. See ASSYRIA.

CU'PID, according to classic mythology, the god of love. He was the son of Mars, the god of war, and Venus, the goddess of love. His attributes were the bow, quiver and wings, and he was represented in painting and sculpture as a chubby child with gauzy wings and roguish, dimpled face. Cupid loved a fair mortal princess, Psyche, who after many trials was granted immortality by the gods. As Cupid is the emblem of the heart, his love, Psyche, is the symbol of the soul. See PSYCHE.

CU'POLA, in architecture, a spherical, domelike vault, on the top of an edifice, so called because of its resemblance to a cup. The Italian word *cupola* covers a circular building, like the Pantheon at Rome and the Round Temple of Vesta at Tivoli. The term is also applied distinctively to the concave interior, as opposed to the dome, which is the entire curved structure. The term *cupola* is commonly, though incorrectly, applied to any small dome-lantern or observatory projecting above a roof. See DOME.

CURASSOW, *ku'ra so,* or *ku ras'o,* a name given to a bird closely related to the crows or partridges. The crested curassow is found in Guiana, Mexico and Brazil and is a handsome bird, nearly as large as a turkey and more noble in appearance, being of a dark violet color with a purplish-green gloss above and on the breast. The abdomen is snowy white and the crest is golden. See GUAN.

CURCULIO, *kur ku'li o,* a family of beetles with rough coats and long snouts, sometimes called *snout beetles.* Among the numerous species are some of the insects which prey on orchard fruits; the plum, peach, apricot, cherry and apple crops also are often seriously menaced by their ravages. During the winter the beetles hide in the bark, and when the spring arrives they emerge from their hiding places to feast on the flowers and foliage. The eggs are laid in the fruit, the female using her snout to press them into the pulp, and when the grubs are hatched they eat the fruit on the inside. Beetles can be killed with arsenate of lead solution, two pounds of which should be mixed with fifty gallons of water. Infested

fruit should be shaken from the tree and destroyed, to protect the unspoiled crop.

CURFEW, *kur'fu,* the ringing of a bell at a certain hour of the evening, usually at nine o'clock, to indicate that all outdoor occupations must cease and that people must remain within doors. The custom was common during the Middle Ages and was introduced into England by William the Conqueror. The law was repealed by Henry I in 1103, but the bell continued to be rung in many districts to modern times, and is still rung in a few small towns. Similar ordinances for keeping children off the streets have been passed in some American cities.

Curfew Must Not Ring To-night is a popular poem based on the custom. It tells the story of a girl in the Cromwell era in England who saved her lover from death by clinging to the bell clanger and thus preventing its sounding the hour set for his execution. The author is Rose Hartwick Thorpe.

CURIE, *ku re',* Pierre (1859–1906), and Marie Sklodowska (1867–), French scientists, the discoverers of the wonderful properties of radium. Professor Curie was born in Paris, was educated at the Sorbonne, and later became professor of physics there. In 1898, after several years of investigation, Cuire and his wife announced the existence of radium. In 1903 they were awarded the Davy Medal of the Royal Society and one-half of the Nobel prize in physics. After the death of her husband in 1905, Madame Cuire, a Polish woman educated in Paris, succeeded him as professor of physics at the Sorbonne and in 1911 her further researches won for her the Nobel prize in chemistry.

MADAME CURIE

CUR'LEW, a genus of birds belonging to the same family as the snipe and woodcock. The birds have long, slender, partly naked limbs, short, rounded tails and very long, slender bills. In North America are found the *Hudsonian* and *Eskimo* curlews, which nest in the Arctic regions in summer and visit Southern South America in winter; and the *long-billed* curlew, found in various parts of the United States. Its beak is sometimes eight inches long. All curlews build crude nests on the ground.

CURL'ING, a favorite Scottish winter amusement, played, also, to some extent in the United States. Large, smooth stones having somewhat the shape of a flattened hemisphere, with an iron or wooden handle at the top, and from thirty to forty-five pounds in weight, are slid along a prepared course on the ice. The object of the player is to lay his stone as near to the mark as possible, to guard that of his partner which has been well laid before or to strike off that of his antagonist. Each player throws two stones, and then the count is made and the play resumed from the other end of the course. A series of match games is called a *Bonspiel.* International matches are played between Canadians and Americans.

CURLING STONE

CUR'RANT, the name of two well-known shrubs cultivated in gardens for their fruit. The red currant, which is used principally for jellies, is a native of Southern Europe, Asia and Americas. The white currant is a cultivated variety of the red. The black currant, native to most parts of Europe and found abundantly in Russia, has a strong taste and odor, but it is used for jelly and in making tarts and puddings, to which it adds excellent flavor. The dried currants of commerce are really raisins, a small variety of grape which originally came from Corinth and therefore received the name of currant.

CURRENCY. See Money.

CURRENTS, Ocean. See Ocean Currents.

CUR'RIE, Arthur W., Sir (1875–), a Canadian military officer who gained renown in the World War as commander of the Canadian forces. He was born in the County of Middlesex, Ont., of Scotch-Irish parentage, attended the village school of Napperton, and completed his education at the Strathroy Collegiate Institute. After teaching school in Sydney, B. C., he engaged for several years in the insurance business, ultimately becoming head of a real estate firm. In 1895 Currie enlisted as a private in the Fifth Regiment of the Canadian Gar-

rison Artillery in British Columbia, rose steadily to the rank of Lieutenant-Colonel, and in 1913 was transferred to the Fiftieth Gordon Highlanders of Canada, Victoria.

Currie was one of the first Canadians to volunteer for active service at the outbreak of the World War. As soon as mobilization orders were received he entrained with his Highland Regiment for the concentration camp, Valcartier, in Quebec, was soon made brigadier-general, and eventually reached Flanders. At the second battle of Ypres, April, 1915, where the Canadians saved the allies from a terrible disaster, Currie's brigade, the second, won special glory. In September General Currie succeeded to the position of General Commanding Officer of the First Canadian Division; it was this division that won the famous Battle of Vimy Ridge, and of which its general said that it never lost a trench.

In June, 1917, General Currie succeeded Sir Julian Byng in command of the Canadian army in France, and until the end of the war he led his troops in hard and continuous fighting. He was made a Companion of the Order of the Bath by King George, and received from France the Croix de Commandeur and the distinction of commander of the Legion of Honor.

CURTIS, George William (1824–1892), an American writer, orator and publicist, born in Providence, R. I. He was a member of the Brook Farm Community for eighteen months (see Brook Farm), and after leaving there he traveled for a time in Europe and the Orient. For years he was editor of *Putnam's Monthly,* and he began in 1853 the "Editor's Easy Chair" papers in *Harper's Monthly.* On the establishment of *Harper's Weekly* he became one of its editors. During the later slavery struggle he worked earnestly, through the press and from the platform, for the cause of liberty. After the Civil War he devoted himself to reform movements, especially civil service reform, in the agitation of which he was long the most conspicuous figure. All his works, both his addresses and his purely literary productions, are marked by grace of diction, dignity and high moral sentiment. A novel, *Trumps,* and many of his other books appeared first in periodicals. Perhaps the best known of his writings is *Prue and I.*

CURTISS, Glenn Hammond (1878–), an American aviator, famed for his invention of the flying boat, and for many brilliant flights and demonstrations. He was born at Hammondsport, N. Y., and from his boyhood was interested in mechanical vehicles. In 1906 he came into wide notice by establishing a new speed record when he rode a specially constructed motorcycle (his own invention) at Ormond Beach, Fla., making a mile in 26.4 seconds. In 1908 he won the *Scientific American* cup with an aeroplane at Hammondsport, and the next year he carried off the International cup at Rheims, France. In 1910 he made a flight from New York to Albany (150 miles) in two hours, twenty-one minutes, winning the New York *World* prize of $10,000. Later Curtiss received the Aero Club of America trophy for his invention of the hydroaeroplane and the flying boat. The Smithsonian Institution awarded him a medal in 1913. Curtiss ranks second only to the Wright brothers in his contributions to the science of air navigation. See Flying Machine.

CURVE, a line which changes its direction at every point. A line which curves continuously at a uniform rate, having all its points equally distant from a point within, is called a circle (which see). The curved line has an important place in higher mathematics.

CUR'ZON, George Nathaniel, Lord (1859–), an English diplomat and statesman, born at Kedleston and educated at Baliol College, Oxford. He first became private secretary to the Marquis of Salisbury. Afterwards he sat in Parliament for twelve years. During a portion of the time he was Under-Secretary of State for India, and during the remaining portion was Under-Secretary of State for Foreign Affairs.

In 1898 Lord Curzon was appointed Viceroy and Governor-General of India, a position which he held until 1905. His administration was characterized by energy and ability and was notable for the aid which he gave to education in the Empire, the strengthening of the military forces and his open opposition to the encroachments of Russia upon English territory in the East. His resignation in 1905 was due to his opposition to Lord Kitchener's policy of making the army in India superior to the civil government. He continued, however, in public life, and on his return to England took a seat in the House of Lords. In 1895 Lord Curzon married Miss Daisy Leiter of Chicago. In 1916, ten years after her death,

Canadian Official Photograph

GENERAL SIR ARTHUR CURRIE, K. C. B., D. S. O.

Commander of the Canadian Armies in the World War.

he married Mrs. Grace Duggan of Buenos Aires. In January, 1919, Lord Curzon was made a member of the new Cabinet organized by Lloyd George, becoming President of the Council and leader in the House of Lords.

CUSH'MAN, CHARLOTTE SAUNDERS (1816–1876), an American actress, famed for her interpretation of tragic rôles. In 1915 she was awarded a place in the Hall of Fame (which see), and was the first stage personage to receive this honor. Miss Cushman made her first appearance in opera and scored a distinct success, but the loss of her voice made her decide to study for the drama. Her first rôle was Lady Macbeth, which remained throughout her career her greatest part. Among her other rôles were Juliet, and Meg Merrilies in Scott's *Guy Mannering.* Although most famous in tragedy, she was very successful, also, in such rôles as Lady Teazle. She retired from the stage in 1874.

CUS'TER, GEORGE ARMSTRONG (1839–1876), an American soldier, the hero of a battle with the Sioux Indians. He was graduated at West Point, and at the outbreak of the Civil War was given a commission in a cavalry regiment. General McClellan was so impressed by his energy and bravery that he appointed him aid-de-camp. Captain Custer took the first colors captured by the Union army. In 1863 he was appointed brigadier-general of volunteers, and he gained the rank of major the same year. For gallantry at the Battle of Winchester he was made brevet colonel and major-general of volunteers. After the war, he served on the Great Plains, and in June, 1876, his whole command was defeated and slain on the Little Big Horn, by the confederate Sioux under Sitting Bull. The spot has become a national cemetery.

CUS'TOMS DU'TIES, the taxes levied upon goods passing from one country to another. The system of customs duties dates probably as far back in history as ancient Greece, though the name is of comparatively recent origin. This arose in the long conflict between the Crown and Parliament in England over the right of taxation. To meet the claims made by the House of Commons to the exclusive right to vote all supplies, it used to be maintained that there were certain duties on exportation and importation to which the crown had acquired a right by *custom;* and the name thus acquired was retained after the power claimed by the lower branch of Parliament had been settled by permanent legislation. The first custom-house was erected in London in 1304.

Customs duties are now seldom levied on exports, so that the term is practically synonymous with *import duties.* They are of two kinds, *specific,* that is, reckoned on the quantity (weight or number), and *ad valorem,* reckoned on the value of merchandise. The former are far more easily assessed and collected. A bitter controversy has always been waged over the expediency of customs duties between the advocates of absolutely *free trade,* those who wish to have no impediment to the free transfer of goods, and the *protectionists,* who wish to set up duties, by which to exclude foreign goods from competition with those of home production. (See TARIFF; FREE TRADE.)

Upon the organization of the United States government after the close of the Revolution the system of customs duties then in operation in England was adopted with scarcely any modification, under the direction of Alexander Hamilton, the first Secretary of the Treasury, the first custom-house being established in New York in 1799. Among the especial features of the new customs system was that of debentures, or drawbacks, which were certificates entitling an exporter of imported goods to a rebate of duties paid on their importation, if he wished to re-export them. Subsequently the object thereby accomplished was more directly facilitated by permitting the importer to "bond" his goods in government warehouses until he was able to pay the duties; and later on the practice was modified still more in favor of the importer by permitting him to take out of "bond" from time to time portions of the invoice of goods consigned to him, paying the proportionate amount of duties. If goods are to be re-exported they can be withdrawn from bond without the payment of duties. This system of *bonded warehouses,* which is now a feature of the customs service in every civilized country of the world, was embodied in an act of Congress passed in 1846, known as the Walker act.

In normal times it is intended that the moneys received from customs and from the collection of internal revenue (which see) shall defray a very considerable part of the expenses of the national government.

CUT'LERY, a term applied to all cutting instruments made of steel. The finer articles,

such as the best scissors, penknives, razors and lancets, are made of cast steel. Table knives, plane irons and chisels of a very superior kind are made of shear steel, while common steel is wrought into ordinary cutlery. One of the commonest articles of cutlery, a common razor, is made as follows: The workman, being furnished with a bar of cast steel, forges his blade from it. After being brought into true shape by filing, the blade is exposed to a cherry-red heat and instantly quenched in cold water. The blade is then tempered by first brightening one side and then heating it over a fire free from flame and smoke until the bright surface acquires a straw color. The blade is again cooled and is then ready to be ground and polished.

CUTTLEFISH, the common name for certain mollusks, generally applied to the particular species from which sepia is prepared (see SEPIA). A small shell or bone, sometimes called the *pen*, is inside the animal, and this is the cuttlefish bone placed in birdcages. When a cuttlefish is pursued and in danger of being captured, it throws out from a bag a black substance which darkens the water and enables the animal to escape. It is from this substance that sepia is obtained. All cuttlefish are marine animals, and in the tropics some very large specimens have been found.

CUTWORM, a caterpillar which preys on wheat, corn and other grains and on garden vegetables. The cutworms feed at night, and by day remain in hiding underneath the soil. Usually they cut off the plant attacked close to the ground, but some cutworms climb trees and sever buds and tender leaves. These pests may be destroyed with poison sprays. Where bits of withered vegetation show the presence of cutworms, the earth should be dug over and the worms killed. Cutworms are the larvae (young) of a genus of night moths.

CUVIER, *koo vya'*, GEORGE LEOPOLD CHRETIEN FREDERIC DAGOBERT, Baron (1769–1832), a distinguished French naturalist, born at Montbéliard. His lectures on natural history, distinguished not less for the elegance of their style than for profound knowledge and elevated speculation, were attended by all the accomplished society of Paris. In 1800 he was made professor of natural history in the College of France. Under Napoleon, who fully recognized his merits, Cuvier held important offices in the department of public instruction. In 1819 he was received among the forty members of the French Academy. Among his best-known works are *An Elementary Table of Animals, Lessons in Anatomy* and *The Animal Kingdom.*

CYANOGEN, *si an'o jen*, a compound of carbon and nitrogen. It is a colorless gas of a strong odor resembling that of peach pits, and burns with a rich purple flame. Cyanogen is highly poisonous. It unites with oxygen, hydrogen and most nonmetallic elements, as well as with the metals, forming cyanides. Combined with hydrogen it forms prussic acid, which is the most powerful poison known.

CYCADS, *si'kadz*, a family of plants resembling palms or ferns in their general appearance, but more nearly related to the pines. The leaves are large and featherlike, and usually rolled like a crozier when in bud. All are natives of warm regions, and many are handsome plants. Fossil remains show that cycads are trees of great antiquity and that they once formed a much larger part of vegetation than they do at the present day.

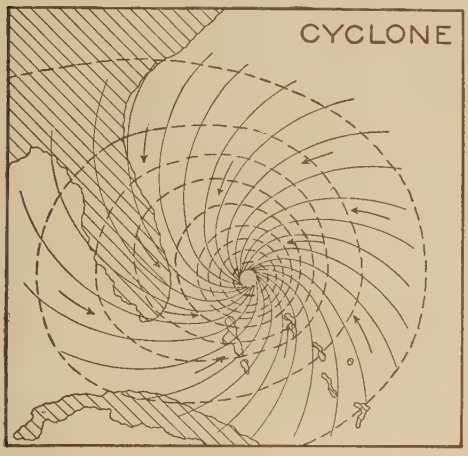
CYCLADES, *sik'la deez*, a group of islands in the Grecian archipelago lying southeast of Greece, in the possession of Greece, forming a separate province. The largest islands belonging to this group are Andros, Paros, Tenos, Delos, Naxos and Rhenea. The islands are mountainous and have productive soil. Grapes and olives are raised, and fishing is one of the most important occupations of the people. Hermopolis, the principal trade center, is situated on the island of Syra. Much valuable building stone, including marble, is obtained from the Cyclades. Population, about 130,000.

CYCLAMEN, *sik'lah men*, a genus of primroselike, bulbous plants, natives of Europe and Asia, but now commonly grown in the United States. They are all herbs with handsome, white, rose-colored or purplish flowers, and are favorite greenhouse plants. The leaves, which are large, heart-shaped and variegated in color, add much to the beauty of the plant. The flowers are scentless.

CYCLOMETER, *si klom'e tur*. See SPEEDOMETER.

CYCLONE, *si'klone*, a circular, or rotary, storm or system of winds, varying from fifty to 500 miles in diameter and revolving

around a center, which advances at a rate that may be as high as forty miles an hour. The term is popularly applied to the destructive wind storms common in the Mississippi Valley, but these are technically known as tornado (which see). Cyclones of greatest violence occur within the tropics. Two storms in different hemispheres revolve in opposite directions. In the southern hemisphere the direction of a storm is like that of the hands of a clock, and in the northern hemisphere it is opposite to that of the hands of a clock. The cyclones of the West Indies

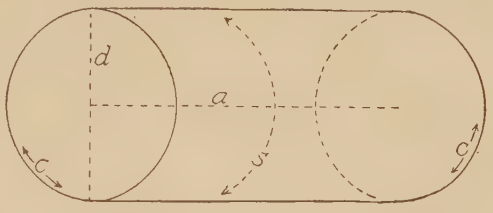


are described in the article HURRICANE. An *anticyclone* is a storm of opposite character, the general tendency of the winds being away from the center. The anticyclone usually follows the cyclone and produces fair weather. Cyclones are preceded by a singular calm and a great fall of the barometer. Nearly all storms are cyclonic in their nature, but in the temperate regions the movements are so mild that the rotary motion of the storm is lost sight of except by trained observers of the weather bureau. See STORMS.

CYCLOPS, *si'klops,* in Greek myths, a fabled race of one-eyed giants, the sons of Uranus and Ge (Heaven and Earth), slain by Apollo. They were usually represented as a numerous race living in Sicily and rearing cattle and sheep, but later traditions describe them as the servants of Vulcan working under Aetna and engaged in forging armor and thunderbolts.

CYLINDER, *sil'in dur,* a circular solid whose two bases are equal parallel circles, and whose diameter is the same throughout its length. The distance between the circular bases is the altitude of the cylinder; its curving surface is the lateral or convex surface.

Volume of a Cylinder. The volume of a cylinder is equal to the area of one of the bases multiplied by the distance between



EXPLANATION OF THE CYLINDER
a, altitude; c, circumference of base, or perimeter; d, diameter; s, lateral surface.

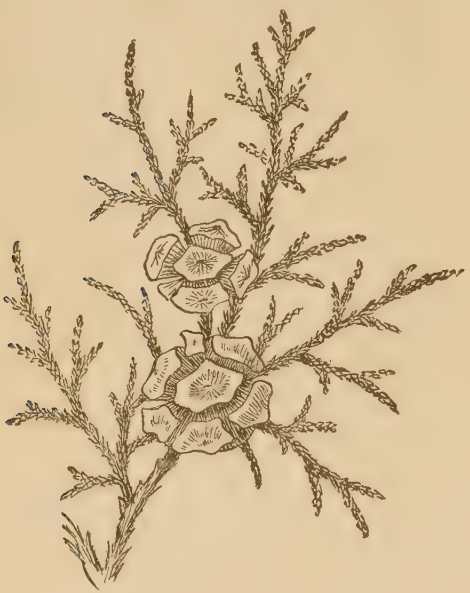
them, or the altitude. To find the area of a base, use the formula employed in finding the area of a circle: Area=3.1416×radius^2 (see CIRCLE). Therefore, volume of cylinder=3.1416×radius^2×altitude. See MENSURATION, subhead *The Cylinder.*

CYMRI, *kim'ri,* a branch of the Celts. The Cymri appear to have succeeded the Gaels in the great migration westward, and to have driven the Gaelic branch into Ireland, the Isle of Man and the Highlands of Scotland, while they themselves occupied the southern parts of Britain. At a later period they were themselves driven out of the Lowlands of Britain by the invasions of the Angles, Saxons and Jutes, and were compelled to take refuge in the mountainous regions of Wales, Cornwall and the northwest of England. Wales may now be regarded as the chief seat of the Cymri.

CYNIC SCHOOL OF PHILOSOPHY, or **CYNICS,** a group of Greek philosophers of the fourth century B. C., who developed a system of doctrines based upon the principle that virtue is the only good. As defined by Antisthenes, virtue is practically a wise direction of life, and of itself it constitutes happiness. Since continued happiness is not possible if wants and desires which may not be satisfied are regarded, virtue consists in living, as much as possible, in independence of disturbing wishes. The simplest, most natural life is desirable. Art, literature, science, wealth, honor and pleasure are to be discarded, because they give rise to wants that cannot be satisfied. The most ardent follower of this school was Diogenes (which see), by whom its doctrine was carried to extremes in the ordinary affairs of life.

In modern speech a *cynic* is one who disbelieves in or doubts the wisdom of social usages, or of personal character or motives, and expresses his doubts by sarcasm or sneers.

CYPRESS, *si'pres*, a genus of cone-bearing trees, distinguished by their small, dark, evergreen, opposite leaves and their tiny, solitary flowers. The best-known species is the *common cypress* of Europe, which is a dark-colored evergreen, with extremely small leaves, which entirely cover its branches. It has an almost quadrangular shape, except at the top, where it becomes pyramidal. Cypress trees are rather dark and somber in



CYPRESS LEAVES AND CONES

appearance and have long been used for decorative purposes in cemeteries; and branches of cypress were formerly worn at funerals as emblems of mourning. The wood is hard, compact and durable and has a reddish color and pleasant odor.

The *bald cypress*, common to the swamps of the Southern states, is a deciduous tree and one of the most valuable of timber trees. Although the wood is soft, its remarkable durability under water makes it of great value, and the size of the tree furnishes timbers of large size. In the regions where the tree grows to best advantage, it forms great forests, covering many square miles of territory. A peculiar feature of the tree is the development upon its roots of peculiar knots, or growths, called *knees*, which sometimes reach a height of ten feet and when fully grown have their tops above the water. It is not well understood of what use these knees are to the trees. In the United States the annual lumber cut of cypress amounts to nearly 1,000,000,000 board feet and is valued at more than $20,000,000.

CYPRUS, *si'prus*, an island lying forty miles south of Asia Minor in the Mediterranean Sea, belonging to Great Britain. It is the third in size among the Mediterranean islands, ranking next to Sicily and Sardinia, and has an area of 3,584 square miles. In 1916 the population, not including military forces, was 298,775. The principal towns are Nicosia, the capital, 16,052; Limasol, 10,302; and Larnaca, 9,262. Agriculture is the chief occupation of the people, and the most important products are wheat, barley, vetches, oats, olives, cotton and grapes. The government has encouraged farming by constructing irrigation works, and there is a Forest Department which is helping to preserve and develop the timber.

Copper mining, anciently of great importance, has been resumed, and the island is one of the world's few sources of asbestos. It is of interest to know that the derivation of our word *copper* may be traced to *Cyprus* (see COPPER). The island has over 700 miles of good carriage road, cable connection with Alexandria, a narrow-gauge railway, and telegraph service. Cyprus has been a possession of many different countries; from 1878 to 1914 it was administered for Turkey by England. On the outbreak of the World War it was annexed to the British Empire.

CYRUS, *si'rus* (about 600–529 B. C.), king of Persia, a celebrated conqueror, called *Cyrus the Great*. According to Herodotus, he was the son of Cambyses, a famous Persian, and of Mandane, daughter of the Median king Astyages. Herodotus states that Astyages, troubled by a prophecy that his grandson was to dethrone him, gave orders that Cyrus should be destroyed immediately after his birth, but the boy was saved by the kindness of a herdsman and at length was sent to his parents in Persia. He soon gathered a formidable army, conquered his grandfather and became master of Media and founder of the Medo-Persian Empire. According to the records, he proved a wise and moderate king. After his conquest of Media and Persia he invaded Lydia, conquered the

country and then turned against Babylon, which fell almost without a contest before the victorious arms of the hosts of Cyrus. The conqueror entered the city in triumph and made himself king. Here he showed his generosity toward conquered peoples by contributing to the release of the Jews from captivity. Cyrus was killed in an expedition against the Scythians, who dwelt north of his domains.

CYRUS, (?–401 B. C.), called *The Younger,* to distinguish him from Cyrus, the founder of the Medo-Persian monarchy, was the second son of Darius II. He formed a conspiracy against his elder brother, Artaxerxes Mnemon, and was condemned to death, but was released at the request of his mother and made governor of Asia Minor. Here he secretly gathered an army, of which 10,000 were Greek auxiliaries, and marched eastward. His brother with a large army met him in the plains of Cunaxa (401 B. C.), and in the battle which followed, Cyrus was slain. The account of the expedition and the retreat of the Greek soldiers is given by Xenophon in the *Anabasis.*

CZAR, or **TSAR,** *zahr,* a title borne by the emperors of Russia before the revolution of 1917. The word is a corruption of the Roman title *Caesar,* first adopted in 1547 by Ivan the Terrible. The empress of Russia bore the title *czarina,* while the heir apparent and his wife were known as the *czarevitch* and *czarevna.*

CZECH, *chek,* a division of the Slavic race occupying parts of Bohemia, Moravia, Austrian Silesia and Northern Hungary, or Slovakia. Bohemia is their great stronghold, and Prague is the chief center of Czech culture. The Slovaks of Moravia and Slovakia are their nearest kindred; in fact, the Czechs and Slovaks are practically one race, and speak nearly the same dialect. These peoples were under Austrian rule for centuries, but they were restive and intensely conscious of a national spirit that found definite expression when the World War created a crisis in the dual monarchy of Austria-Hungary. The result was the formation of the Czecho-Slovak Republic. Czech literature has had a continuous existence from the ninth century, and is represented by works of poetry, fiction, science and history. At Prague there is a flourishing Czech university and a national theater. See CZECHO-SLOVAK REPUBLIC.

Related Articles. Consult the following titles for additional information:
Bohemia Prague
Czecho-Slovak Republic World War

CZECHO-SLOVAK REPUBLIC, one of the new states erected in 1918 from the ruins of the Austro-Hungarian monarchy. It embraces the former Austrian crownlands of Bohemia, Moravia and Silesia, and a section of Northern Hungary called Slovakia. According to the tentative boundaries marked out before the final decisions of the peace conference, the young republic has an area of about 50,000 square miles. Prague, Bohemia, is the capital. The population is approximately 10,000,000. There is a minority of Germans, but the chief element of the population is Czech and Slovak. The Czechs and Slovaks are practically one race and speak about the same language (see CZECH).

For many years before the World War the national movement of the Czecho-Slovaks had been causing the Austrian government great anxiety. In Bohemia, especially, the agitation for independence could not be checked, and the bitter opposition of the people to the cause of the central empires added considerably to the troubles of the dual monarchy throughout the war. Thousands of Czechs and Slovaks deserted to the Russians, and when Russia withdrew from the war, the Czecho-Slovak regiment started for France by way of Siberia. While on the march they came into conflict with Russian revolutionists, and were kept in Siberia by the allies to guard the Trans-Siberian Railroad. Others of their kindred formed legions and fought for the allies in France and Italy.

A national Czecho-Slovak Council was organized in Paris under the presidency of professor Thomas Masáryk, of the University of Prague, and in June, 1918, the independent Czecho-Slovak state was officially recognized by France. Great Britain gave similar recognition in August, and the United States followed in September. On October 19 a declaration of independence was issued in Paris, as by that time the Czechs had become masters in Prague and had placed Czech money in circulation. The close of the World War made the impending break-up of Austria-Hungary an accomplished fact, and the Czecho-Slovak Republic was duly erected, with Professor Masáryk as its first President.

At the peace conference which met in Paris early in 1919 the claims of the new state were considered, and its definite boundaries were to be fixed. The young nation was confronted with serious economic problems from the outset. In March, 1919, the food situation was given personal attention by Herbert Hoover, food administrator of Europe.

Related Articles. Consult the following titles for additional information:

Austria-Hungary	Masáryk, Thomas
Bohemia	Moravia
Hungary	World War

CZERNOWITZ, *cher'no vits,* the capital of Bukowina, formerly a crownland of Austria. The city is about 164 miles southeast of Lemberg. Among the prominent buildings are the archiepiscopal palace, the Greek-Oriental cathedral and a handsome Jewish synagogue. The educational institutions include a university, with a library of 94,000 volumes, a gymnasium and industrial and trade schools. There are manufactories of machinery, oil, lumber and beer. During the World War Czernowitz was thrice captured by the Russians, but was each time reconquered. At the close of the war, in 1918, when Austria-Hungary ceased to exist, Bukowina was claimed both by Rumania and the Ukraine. Its fate, and that of Czernowitz, were to be decided by the peace conference. Population, 1914, estimated, 94,000.

D

D, the fourth letter in the alphabet. In form the English D is the same as the Latin D, which was developed from the Greek Δ. This, in turn, was derived from the Phoenician character, which was probably an outgrowth of an original hieroglyphic representation of a door. The Δ does, in fact, still retain a resemblance to a tent door. In corresponding words of related languages, *d* is often interchanged with *t*, which it resembles in its mode of pronunciation.

In music D is the second note in the natural, or C, scale. As an abbreviation D represents five hundred, and when a line is placed above it, D represents five thousand.

DAB'CHICK, a name which in the United States is commonly given to the pied-billed grebe. See GREBE.

DACE, *dase*, a river fish which attains a length of about ten inches, found in central North America from the eastern shores to the Missouri River. It is bluish above and creamy below, and there is a slight yellowish band on the side. The fish described is commonly called the horned dace, because it bears a black spot on its dorsal fin. Other names for the dace are *dare* and *dart*.

DACHSHUND, *daKhs'hoont*, a strangely formed dog with short legs and a long, round body, formerly used in the central part of Europe in hunting foxes and badgers. Though the dachshund is grotesque in appearance, it is prized as a household dog in many parts of the world, particularly in Germany, because of its intelligence and courage. The animal has broad, rounded ears, a long, cone-shaped head, long, tapering tail and paws turning outward. The short, silky coat may be reddish-brown, black and tan, gray and tan or spotted.

DADDY-LONG-LEGS, the popular name of a spiderlike insect, known also as the American *harvestman*. It has a body usually oval or globose, and long, exceedingly slender legs, which are rather elevated in the middle, so that when the animal walks its body almost touches the ground. It has a peculiar, disagreeable smell, and feeds upon insects. Often the daddy-long-legs is seen in great numbers in barns or other sheltered places. In England the term is applied to the crane fly.

DAEDALUS, *ded'a lus*, a mythical Greek architect and artisan. He built for the king of Crete the labyrinth in which the Minotaur was confined, but having seriously offended the king, he was himself imprisoned. To effect his escape and that of his son, he made two pairs of wings, which he fastened on their shoulders. The son, Icarus, in flying across the sea, rose so high that the heat of the sun melted the wax with which the wings were fastened together, and he fell into the sea and was drowned. Daedalus was unharmed. See MINOTAUR.

DAF'FODIL, the popular name of certain species of narcissus, which are among the earliest flowers of spring. The trumpet daffodil is the one mentioned so frequently in English poetry, and the one described so beautifully by Wordsworth in his *Daffodils*.

DAGO, *dah'ge*, **ISLAND**, an island in the Baltic Sea, geographically a part of Esthonia, situated near the entrance to the Gulf of Finland. Its surface consists of chalk beds and swampy lowland, and the inhabitants, who number about 16,000, engage chiefly in fishing and agriculture. The island is 370 square miles in area. It was captured by the Germans in 1918 during the World War, after having been a Russian possession since 1721. At the close of the war the Germans withdrew. See ESTHONIA.

DAGUERREOTYPE, *da ger'o type*, the original photographic process, so called from its inventor, Daguerre, (see below). It con-

sisted in sensitizing a silver plate with the vapor of iodine and then placing it in a camera obscura, previously focused, and afterward developing the picture by vapor of mercury. It was then fixed by immersion in hyposulphite of sodium. After thorough washing and drying the picture was covered

DAHLIAS

with glass to prevent its being rubbed off. The process is now replaced by photography (which see).

Louis Jacques Mandé Daguerre, *da gair'* (1789–1851), was originally a scene-painter at Paris, but as early as 1814 his attention was directed to the subject of photographing pictures on metal. In 1833 he succeeded in perfecting the new photographic process, which caused a great sensation in the world of science. Daguerre was made an officer of the Legion of Honor, and an annuity of 6,000 francs ($1,200) was settled on him.

DAHLGREN, *dal'gren*, **John Adolph** (1809–1870), an American naval officer and artillerist. He entered the navy in 1826. In 1850 he brought forward an invention of a type of cannon, which was named for him and which was of great value during the Civil War, but later became obsolete. At the beginning of the war he became commandant of the Washington navy yard, and in 1863 was made rear admiral and was placed in command of the South Atlantic blockading squadron. In 1866 he commanded the South Pacific squadron, and in 1868 took charge of the bureau of ordnance in Washington. In the following year he was again appointed commandant of the Washington navy yard.

DAHL'IA, (or *dale'ya*), a genus of plants belonging to the composite family, so called after the Swedish botanist Dahl. Dahlias are native of Mexico, but they are extensively cultivated in the United States and Europe, in an immense number of varieties, producing large and beautiful flowers of almost every imaginable color.

DAHOMEY, *da ho'mi*, now a part of French West Africa, was formerly an independent negro kingdom. Its northern boundary is not well defined, but it extends in a narrow belt southward between Togo and Nigeria to the Gulf of Guinea, an Atlantic arm, where is found its chief city and seat of government, Porto Novo, which has 20,000 inhabitants.

The area of Dahomey is 39,000 square miles, and its population was 911,749 in 1915; only 735 were white. The natives are of pure negro stock, and wherever the soil is fertile they are good agriculturists, raising corn, yams and potatoes. The forests contain cocoanut palms and oil palms, and a decreasing supply of rubber.

France gained a foothold here in 1851 and gradually extended its influence in the form of a protectorate (which see) until 1894, when the whole kingdom became a part of French West Africa.

DAI'RYING, or **DAIRY HUS'BANDRY**, that branch of agriculture which is given to the production of milk and its various products. Dairying has always been given some attention on farms, and in Denmark and Holland it has been the leading agricultural occupation for many generations. Dairying as a distinct occupation in the United States has developed since 1860, the year in which the first cheese factory was built.

Dairying is carried on for three purposes —selling milk, making butter and making cheese. Milk is sold to supply the consumers in cities and for the purpose of making condensed milk. The by-products of milk are

skim milk, buttermilk and whey. These are usually mixed with meal and fed to swine. Whey and skim milk are also used extensively in the manufacture of milk sugar.

It was formerly supposed that dairying could be carried on with profit only within a limited section of the country and during the summer months; but the use of scientific methods has shown that, with proper care, good butter and cheese can be made in nearly all parts of North America, and that dairying can be made profitable during the entire year.

The rapid growth of cities and the enormous development of transportation facilities have exerted a great influence on the progress of this industry. As the growth of the cities has increased the dependence of millions of inhabitants on the farmer for food, the demand for dairy produce has greatly increased, while the improved means of transportation have made possible the delivery of the produce to the cities at a profit to the farmers. The general changes in the character of industry have thus led many to adopt dairy farming as a specialty instead of following it incidentally. The United States is the leading dairy country in the world. It contains over 23,000,000 milch cows, has a total milk production of nearly 85,000,000,000 pounds a year, and has a correspondingly large production of butter, condensed milk and cheese.

The Dairy. Some of the leading scientific principles of animal husbandry are readily illustrated by showing their application to a dairy farm. To conduct a dairy successfully the dairyman must give careful attention to the following particulars:

1. Careful selection of his herd.
2. The construction and maintenance of suitable stables and other buildings necessary to the work.
3. Providing the right sort of pasturage.
4. Providing the right sort of feed in addition to pasturage.
5. Facilities for the care and marketing of the dairy products.

Neglect of any one of these points is liable to lead to failure in the enterprise.

The Herd. The cows should be selected with reference to the main purpose for which the dairy is conducted. If the dairy is to supply milk for city markets, the cows should be chosen with due regard to the quantity of milk which they produce. If the dairy is devoted to supplying the market with butter, more regard must be paid to the quantity of butter fat in the milk than in the former case.

Experienced dairymen are good judges of cows and seldom make mistakes in the selection of herds. For the benefit of those of less experience the following points, taken from Brook's *Animal Husbandry,* are given:

Head—Small, lean and bony, with large muzzle and mouth. The nose and face should be free from fleshiness.

Eye—Full, large, lively in expression, but at the same time mild, clear and bright. The whole expression of the face and eye should be motherly.

Forehead—May be either straight or dishing, but the latter gives a more well-bred appearance.

Ear—Thin, large, active, and for most breeds should be of an orange color within.

Neck—Should be rather thin, especially near the head, and long. It should be free in most breeds from loose, pendent skin.

Horns—Should be of moderate size.

Shoulders—The animal at the shoulders may be from two to four inches lower than at the hips. The shoulders themselves should be thin, especially at the top, lean and bony.

Chest—Should be deep, that is, it should have a large measurement from top to bottom. It is less broad and roomy than in beef breeds. The section through the animal behind the shoulders should have an elliptical outline. Too great thinness behind the shoulders is, however, a mark of weak constitution .

Back—Should be rather long and rugged. The vertebrae of the backbone should be rather wide apart so that the fingers may be pressed down between the points in the ridge of the back. This is only one feature of the general looseness of structure which is looked for in the dairy type, as contrasted with the close, compact structure which is desirable in the beef type.

Loins—Should be fairly broad, the hip bones rather high and well apart. The bones, moreover, are often rather farther forward than in the beef type. This gives a long and strong hind quarter.

Thighs—The thighs should be thin, especially on the inside, in order to give room for a large udder.

Flank—The flank is well up, and rather thin.

Legs—The legs should be rather short and the hind legs may be rather crooked. The bones of the legs should be moderately fine. The forelegs are comparatively near together, the hind legs wide apart.

Tail—The tail should be long and fine, with a long switch. A long tail is believed to indicate that the vertebrae of the backbone are somewhat loosely connected, which, as has been pointed out, is considered highly desirable.

The General Outline—When looked at from the side, the general outline should be that of a wedge, the upper line, or line of the backbone, and the lower line, or the line of the belly, approaching each other from behind. When looked at from behind or from above, the animal should also present a wedge shape, the lines of the wedge approaching each other from rear to front. The dairy cow, therefore, shows a double wedge. The ribs, to harmonize with this general wedge shape, are rather flat immediately behind the shoulders. At this point they do not spring out very widely, but toward the posterior part of the animal the ribs spring out from the backbone more and more broadly in order to give room for large internal organs "for a big workshop."

The Udder—The udder should not be very pendent, but should obtain capacity by breadth, being wide from side to side, extending well forward, well backward also, and high up between the thighs. It should be broadly and firmly attached to the abdomen. The skin of the udder should be thin and delicate. The udder should be well filled out at the bottom between the teats, and the latter should be wide apart, squarely placed, and of good size.

A daily record of each cow should be kept and those that do not reach the required standard should be sold or fattened for beef and their places taken by others. Only the calves from the best milkers should be retained for future additions to the herd. In this way the strain of the herd will be strengthened from year to year. The record should enlighten the dairyman concerning two points: the average daily quantity of milk given by each cow and the length of time from calving before the quantity of milk begins to diminish. The most profitable animals are good milkers for a long time. They may not produce such large quantities of milk while fresh as some others, but their record for six months or a year shows them to be far more profitable. It costs no more to keep a good cow than a poor one, and the first is kept at a profit, while the second is kept at a loss.

The next thing necessary is a milk test which will show the amount of butter fat as well as the quantity of cream. This test should be made by an expert in a creamery or butter factory if possible, because in these places the necessary apparatus is at hand and an expert is usually in charge. If, however, the farmer is so situated that he must make his own test for milk, by sending to his experiment station for directions, he will receive such assistance and guidance as will enable him to make the test successfully.

Outline on Dairy Products

I. Milk
- (1) Description
- (2) Composition
  - (a) Water
  - (b) Casein
  - (c) Sugar
  - (d) Fat
  - (e) Salt
- (3) Uses
  - (a) Food
  - (b) Basis for butter, etc.

II. Butter
- (1) Manufacture
- (2) Packing and shipping
- (3) Uses

III. Cheese

IV. By-products
- (1) Olemargarine
  - (a) How made
  - (b) Legal restrictions
  - (c) Tax
- (3) Condensed milk

Questions on Dairying

What work is performed by the separator?

What is a creamery? Generally located where?

What causes milk to sour? Give uses of sour milk. What is whey?

Name the different kinds of cheese. What foreign country is noted for its cheese?

How is milk regarded as a diet? Why should it be drunk slowly?

What makes cream rise to the top?

How is it possible for milk to be the means of spreading disease?

Name some of the dishes prepared in cooking whose foundation is milk or cream.

Is milk an absorbent? What dangers lie in this fact? What are some of the rules for the taking care of milk?

In what ways can milk be adulterated?

The Stable. Milk can be produced only from healthy cows, and in most regions where dairying is carried on, proper housing of the herd is the important factor in preserving the health of the animals. Dis-

ease, especially tuberculosis, is frequently contracted because the stable is poorly ventilated and because it is kept in a filthy condition. The stable should be well ventilated and well-lighted. The walls should be kept free from dust and should be frequently whitewashed. Above all, the floors should be kept free from filth and plenty of fresh, clean litter should be spread daily. Open feed troughs and partitions made of piping or iron railing, which will not collect the dust, are the most desirable.

The yard and grounds about the barn should also be free from weeds, manure and rubbish.

Feed. Fresh grass is the most desirable feed for milch cows, but suitable pasturage for a large herd requires so much land that some other source of food supply available all the year is necessary. During the months when pastures are not in grass, the cows must be fed entirely from this other source. The right sort of ration must be determined and the most economic means of supplying it be provided. Many farmers use ensilage, or silage, as it is commonly called.

Related Articles. Consult the following titles for additional information:

Agriculture	Creamery
Butter	Cream Separator
Cattle	Milk
Cheese	Milk, Condensed
Churn	Silo and Silage

DAISY, an attractive, much-loved flower which grows in meadows and fields in Europe and America. The typical daisy is pure white and single with a yellow or brown center, but double daisies have been produced in great variety of colors. The daisy blooms almost continuously and has already become partially naturalized in the New England states. In the United States and Canada the oxeye daisy is a species of wild chrysanthemum, known commonly as the marguerite. In America the name *daisy* is loosely applied to other flowers, such as the black-eyed Susan and some species of wild asters. During the age of chivalry the daisy was the emblem of fidelity and love, but it now signifies simplicity.

DAISY

Shasta Daisies. Accompanying the article on Luther Burbank there is an exact-size picture of the Shasta daisy, and by its side daisies of the size of its original parents. Burbank's achievement with this flower is as fascinating as a fairy story. From all over the world where daisies grew he secured seeds of the best varieties—not simply a few, but thousands. These were planted under best conditions and watched with closest care. They were all destroyed except the best specimens, but from their death there came a new daisy larger and more beautiful and of a hardier variety, one that would flower in every climate. More than 10,000 seeds were required for this one experiment.

DALLAS, George Mifflin (1792–1864), an American Vice-President, born in Philadelphia. He was graduated at Princeton in 1810 and went to Russia as private secretary to Albert Gallatin, special envoy. In 1828 he was elected mayor of Philadelphia. This office he resigned to become United States district attorney. In 1831 he was sent to the United States Senate and later was minister to Russia. He was elected Vice-President with Polk in 1844 and was later sent by Pierce as minister to England.

DALLAS, *dal'as,* Tex., the largest city of the state, though but slightly larger than San Antonio, its nearest rival. It is the county seat of Dallas County, is thirty-one miles east of Fort Worth, on Trinity River, and on nine railroads, which give it distinction as the greatest railroad center of the state. These roads are the Santa Feé, the Chicago, Rock Island & Gulf, the Texas & Pacific, the Saint Louis Southwestern, the Saint Louis & San Francisco, the Trinity & Brazos Valley, the Texas & New Orleans, the Missouri, Kansas & Texas and the Houston & Texas Central. There are a number of interurban lines. The population in 1910 was 92,104; in 1917, 129,738 (Federal estimate).

Dallas is the chief manufacturing city of the state; in some commodities it takes high rank. It is the largest manufacturer of cotton-gin machinery, for it is in the greatest cotton-producing section of the United States. Few other cities equal its output of saddlery. Sheet-iron products, leather goods, clothing, cement and confectionery are important manufactures. Dallas is a great center for the distribution of agricultural machinery.

Educational facilities are unusually good

The city has the Southern Methodist University, with a campus of over 600 acres and an endowment of $2,000,000; the University of Dallas, Saint Joseph's and Saint Mary's academies, Saint Edward's College and Patten Seminary. There are nearly fifty private schools and a fine Carnegie Library. There are two sanitariums, two city and ten private hospitals and two large cathedrals.

Dallas has a large number of imposing public buildings, including a municipal building with over thirty acres of floors, a large courthouse and one of the greatest hotels in the South, besides many imposing business blocks. There are twenty parks, containing 713 acres. The commission form of government was adopted in 1907.

DALLES, *dalz*, the name given in America to various rocky gorges and the cataracts and rapids flowing in them. The word is the French for *trough* or *drain*, and was first used in its present sense by early French explorers. The dalles of the Columbia are about 200 miles from its mouth, where the river is compressed by lofty basaltic rocks into a roaring torrent. The rocks here present a scene of rare beauty. To overcome the obstacle to navigation at this point in the Columbia, a canal has been constructed around the dalles at a cost of $5,500,000. The dalles of the Saint Louis are a series of cataracts near Duluth, Minn., and the dalles of the Wisconsin are at Kilbourn, Wis.

DALLES, THE, or **DALLES CITY**, ORE., the county seat of Wasco County, eighty-eight miles east of Portland, on the navigable Columbia River and on the Oregon-Washington Railroad & Navigation Co. This portion of the river valley is noted for the grandeur of its scenery. The principal industries are sheep and cattle raising, and grain and fruits are cultivated. The city contains flour and grist mills, salmon canneries and wool-scouring plants and has a large trade in live stock and wool. The military post of Fort Dalles was established in 1838, and the settlement was incorporated in 1858. Population, 1910, 4,880.

DALMATIA, *dal ma'she ah*, a former crownland of Austria, consisting of a narrow strip of land along the eastern shore of the Adriatic Sea. It stretches along the coast from Istria to the city of Cattaro, and is bounded on the north by Croatia, and on the east by Bosnia (including Herzegovina) and Montenegro. The Dinaric Alps form a natural boundary between Dalmatia and Bosnia. The former crownland has an area of 4,956 square miles, including numerous coast islands, and in 1913 it had an estimated population of 658,682.

After the dissolution of Austria-Hungary, at the close of the World War (1918), the right to possess Dalmatia was claimed both by Italy and by the new Jugo-Slavic state. The former based its claim on historical and cultural grounds, and on a secret treaty signed in 1915 by England, Russia, France and Italy, whereby the latter was to come into possession of the eastern shore of the Adriatic after the war. The Jugo-Slavs, on the other hand, claimed Dalmatia by virtue of self-determination of peoples, as Slavs predominate in the Dalmatian population. The question was to be decided by the peace conference, which met in Paris in 1919.

The surface of Dalmatia is diversified by hills and mountains. Because of political unrest agriculture has long been in a backward state, but the fertile valleys produce fruits in abundance, including grapes, figs, olives and a cherry used in making the famous *maraschino* cordial. On the coast, fish, especially the tunny and the sardine, abound. The trade of the country is mostly confined to the coast towns, chief among which are Zara, the capital, Sebenico, Cattaro, Spalato and Ragusa. Cattaro is one of the best natural harbors in Europe.

Dalmatia was anciently the southern portion of the Roman province of Illyricum. In the Middle Ages part of the region belonged to the Venetian Republic. After varying changes of ownership the whole country became in 1814 a part of the Austrian Empire. See WORLD WAR; JUGO-SLAVIA.

DALMORES, *dal mo rez'*, CHARLES (1872–), a French tenor who became an established favorite with American audiences. After completing his musical education at the Paris Conservatoire, he began a public career in Rouen, in 1899, and thereafter was very successful in Belgium, England and Bavaria. Dalmores made his American début in 1906 as a tenor singer of the Manhattan Opera Company, and later joined the Philadelphia-Chicago organization. His most successful rôles include the tenor parts in *Carmen, Samson and Delilah, Romeo and Juliet* and *Tales of Hoffman.*

DAM, a bank, or construction of stone, earth or wood across a stream for the pur-

pose of keeping back the current to give it increased head, for holding back supplies of water, for flooding lands or for rendering the stream above the dam navigable by increased depth. Its material and construction will depend on its situation and the amount of pressure it has to bear. For streams which are broad and deep strong materials are required, usually stone masonry bound in hydraulic cement and a strong framework of timber. The common forms of a dam are either a straight line crossing the stream transversely, one or two straight lines traversing it diagonally, or an arc with its convex side toward the current. See IRRIGATION.

DAMAGES, in law, a money compensation paid to a person for loss or injury sustained by him through the fault of another. It is not necessary that the act should have been a fraudulent one; it is enough that it be illegal, unwarrantable or malicious. It is becoming the common practice in both England and America to allow the damages to cover only the loss sustained, estimated at its real value, together with the expenses incurred in pressing the suit. Formerly it was the usual principle to award damages not only for actual loss, but for "retribution" or "satisfaction," as well.

DAMASCUS, *dam as'kus,* SYRIA, the capital and largest city of the former Turkish vilayet (province) of Syria, in Asia, reputed to be the most ancient city in the world. In September, 1918, it was captured by British forces under General Allenby, after having been in the possession of the Turks for three centuries.

Damascus is beautifully situated on a plain which is covered with gardens and orchards and watered by the Barrada. The streets are narrow, crooked and in parts dilapidated, and, except in the wealthy Moslem quarter, the houses are low, with flat-arched doors. Within, however, there is often a singular contrast, the furniture and decorations being elegant and costly. The chief buildings are the great Mosque and the Citadel. Among the places of historical and traditional interest are the leper hospital in the house of Naaman, the house of Ananias and the place of Saint Paul's conversion. The bazaars are a notable feature of Damascus. In the midst of the bazaars stands the Great Khan, this and thirty inferior khans being used as exchanges, or market places, by the merchants.

Damascus is an important center of trade in European manufactures; it is also a place of considerable manufacturing importance, the principal products being silk, damasks, cotton and other fabrics, tobacco, glass, soap, fine cabinet work and elegant jewelry; but the manufacture of the famous sword blades (see DAMASCUS STEEL) no longer exists. Damascus is one of the holy Moslem cities and continues to be thoroughly Oriental in all its features. After passing successively under the power of Israelites, Persians, Greeks and Romans, it fell at last in 1516 into the hands of the Turks. Population, estimated, 250,000.

DAMASCUS STEEL, a kind of steel originally made in Damascus and the East, greatly valued in the making of swords because of its hardness of edge and flexibility. It was made of pure iron and steel of peculiar quality, containing a larger proportion of carbon than ordinary steel. The steel was produced by careful heating, laborious forging, doubling and twisting. See STEEL.

DAM'ASK, a costly fabric of silk, linen or wool, made by weaving the weft into the warp in such a way as to make figures representing fruit, flowers, leaves and other forms. It gets its name from Damascus, the city where it was first manufactured. Linen damasks are used chiefly for tablecloths and napkins. Damasks of silk and of wool make handsome furniture coverings.

DAM'ASKEENING, the ornamenting of iron and steel with designs produced by inlaying or incrusting with another metal, such as gold or silver. The pattern is etched on the steel, and the other metal is filled into the etched lines.

DAMOCLES, *dam'o kleez,* a courtier of Dionysius, tyrant of Syracuse. Damocles declared one day that he considered the lot of Dionysius the happiest on earth, and Dionysius offered to give him a taste of the glory which he so much envied. While seated at a table surrounded by all the royal appointments, Damocles on looking up was horrified to perceive a sword suspended over his head by a single hair. Dionysius had thus made plain to him the uncertain nature of royal happiness. In current speech the expression, "sword of Damocles," signifies an expected disaster which may come at any time.

DAMON AND PYTHIAS, *pith'i as,* two youths who lived in ancient times in Syracuse, celebrated as models of constant friend

ship. Pythias had been unjustly condemned to death by Dionysius the younger, tyrant of Syracuse; and as he was obliged to leave Syracuse to arrange his affairs, his friend Damon was taken as a pledge that Pythias should return on the day fixed. Pythias, being unexpectedly detained, had great difficulty in reaching Syracuse in time to save Damon from being executed in his place, and Damon made no attempt to escape from his promise. Dionysius was so affected by the proof of their friendship that he pardoned Pythias. The Knights of Pythias, a fraternal order established in the United States, has this incident for its basis (see PYTHIAS, KNIGHTS OF).

DAMROSCH, *dahm'rosh*, LEOPOLD (1832–1885), a German-American musician, the first to establish choral societies in New York. He was graduated in medicine at the University of Berlin and began practice at Posen, but soon abandoned his profession for the study of music and became a concert violinist in 1855. Damrosch later became director of orchestras in Posen and Breslau, and in 1871 went to New York, where he was director of the Arion Society. In 1884 he accomplished his most notable achievement in introducing and maintaining German opera in New York City. He was the composer of numerous cantatas, concertos and songs, and was a frequent contributor to musical magazines.

DAMROSCH, WALTER JOHANNES (1862–), an American musician and orchestra conductor, the son of Leopold Damrosch (which see). His first important position was conductor of the oratorio and symphony societies in New York and assistant conductor of the German opera at the Metropolitan Opera House. In 1900 he conducted German opera in New York and in the following year became conductor of the New York Philharmonic Orchestra, one of the leading organizations of its kind in the country.

DAN, a word meaning *judgment*, refers to two ancient characters. 1. One of the sons of Jacob by Bilhah. At the time of the exodus the Danites numbered 62,700 adult males, being then the second tribe in point of numbers. Samson was a member of this tribe. 2. A town in the extreme north of Palestine. This, with Beersheba in the south, gives rise to the expression "from Dan to Beersheba," meaning the land from north to south, or the entire distance between two places.

DA'NA, CHARLES ANDERSON (1819–1897), one of America's greatest editors, was born at Hinsdale, N. H. He studied at Harvard, but was obliged to leave after two years, because of ill health. He was a member of the Brook Farm Association and one of the editors of a paper established in its interest. After working for other papers he joined the New York *Tribune* in 1847, on the staff of which he remained for fifteen years. During the latter part of the Civil War he was assistant Secretary of War, and after the close of the war he started a Chicago paper, which, however, was not successful. From 1888 he was editor and part owner of the New York *Sun*, and perhaps more than any other journalist his personality was identified with his newspaper.

DANA, JAMES DWIGHT (1813–1895), an American geologist, born in Utica, N. Y. In 1850 he became professor of natural history at Yale College. He wrote *System of Mineralogy, Manual of Mineralogy, Coral Reefs and Islands, Manual of Geology* and *Text Book of Geology*. Dana did much to place American geology on a scientific basis and also to popularize the subject. He was recognized as the foremost American geologist.

DANA, RICHARD HENRY, JR. (1815–1882), an American lawyer and author, son of Richard Henry Dana, the poet. After being obliged to give up his work at Harvard College, he took a sea voyage around Cape Horn to California and published, as a result of his experiences during the voyage, *Two Years Before the Mast*, one of the best sea stories ever written. He became a lawyer and held various important official positions and was expert in international law.

DANBURY, CONN., one of the county seats of Fairfield County, the other being Bridgeport. It is sixty miles northeast of New York City, on the New York, New Haven & Hartford Railroad, and is famous as being the leading American city in the manufacture of hats. Over thirty factories are given to the manufacture of hats and their accessories. The town also manufactures underwear, silk and silver-plated ware. It has a state normal school, is the seat of the county agricultural society, and has a public library and two parks. Population, 1910, 20,234; in 1917, 22,931 (Federal estimate).

DANCING, *dan'sing,* a form of exercise, accompanied almost always by music, in which the participants perform graceful movements in measured time. In its earliest forms among primitive races, dancing was a mode of expressing strong emotions of joy and sorrow, love and rage, and even of the most solemn and impassioned religious feelings; in more civilized forms of human society it becomes a pleasurable form of recreation or an agreeable spectacle at public entertainments.

Dancing corresponds to a universal primitive instinct in man. It is still practiced by the South Sea Islanders, the forest Indians of Brazil, the Zulus, the negroes of Central Africa and the native Australians, exactly as it was in the earlier stages of every civilized modern race. Ferocious war dances were practiced by savage warriors, as, for example, the North American Indian braves, who worked themselves up into frantic mechanical intoxication, capable of carrying them irresistibly on to victory. The Zulu war dance is still a noble exercise for warriors, like the Pyrrhic dance of the ancient Spartans; and the dancing and whirling dervishes in the East, who work themselves into spasms of physical excitement, are still respected for devoutness and piety.

Among the ancient historic peoples dancing was generally an expression of religious, patriotic or military feeling, as in the case of the dance of David before the ark, or the Pyrrhic dance of the Greeks. The Romans, however, like the Orientals, hired slaves to do the dancing. France took the lead in inventing modern dances. Among some of these dances were the graceful *minuet,* the favorite for a century; the *quadrille;* the *galop,* introduced from Germany; the *cotillion,* fashionable under Charles X; the *polka,* first danced at Odeon in 1840 by a dancing master from Prague; the *schottisch,* also of Bohemian origin, first brought out in Paris in 1844; the *lancers,* introduced by Laborde in 1836, and the *waltz,* introduced into European ballrooms in 1795. This graceful dance will probably never lose its popularity. Another favorite is the *two-step,* a livelier dance than the waltz and one adapted to march time. It is of American origin.

Characteristic of particular races or merely of classes of people are such forms of the dance as the Scotch *reel, Highland fling* and *strathspey;* the Irish *jig;* the negro *breakdowns;* sailors' *hornpipes; step-dances, morris-dances* and the like.

So-Called "New" Dances. For a few years after 1911 a dance craze swept over America and Europe, following the introduction into San Francisco of the turkey trot. For a time people were dancing this and others like it—the bunny hug, grizzly bear, Texas Tommy, etc.—but the vulgarity of these dances caused a reaction against them, and others more refined in character became popular. The latter included the tango, one-step and fox trot, based on walking steps, and the hesitation and waltz canter, based on the waltz. On the stage these new dances had an immense vogue for several seasons, but after a time interest in them began to wane.

DAN'DELION, a plant which carpets lawns and meadows with bright yellow in the spring, summer and fall. The leaves are toothed, radiating from the crown of the very long root, and the name is from the French for *tooth of a lion.* The dandelion blooms profusely, bearing many slender stalks, each surmounted by one large, bright yellow head of many small flowers which mature into a beautiful white ball of feathered fruits. These are transported far and wide by the wind. The whole plant is full of a milky and bitter juice. Some species have powerful medicinal properties, and the young leaves of all are often used for greens and salads.

DANDELION

DAN'DRUFF, the visible effect of a disease of the scalp. It appears as a white, scaly substance which loosens from the

scalp in small particles and either adheres to the hair or falls on the clothing. The presence of dandruff gives rather positive assurance that in time the disease will cause the hair gradually to fall out. The best remedy is a vigorous daily scalp massage and an occasional shampoo, in which pure soap is used.

DANIEL, the prophet, a contemporary of Ezekiel, was born of a distinguished Hebrew family. His story is related in these volumes in the article BIBLE, subhead *Bible Stories.*

DAN'IELL BATTERY, a galvanic battery, the cells of which were originally constructed as follows: A tall cylindrical copper vessel was nearly filled with a strong solution of sulphate of copper (blue vitriol). A rod of amalgamated zinc was enclosed in a skin or bladder, which was filled with dilute sulphuric acid and was suspended in a copper cylinder. When the zinc rod was connected by wire with the copper vessel, the current passed from the copper through the wire to the zinc.

The modern Daniell battery consists of a glass jar in which is placed a porous cup containing zinc. This cup is enclosed in a copper cylinder having an opening on one side for the free circulation of the liquid. Dilute sulphuric acid is placed in the cup containing the zinc, and a solution of sulphate of copper is placed in the jar. A small porous vessel filled with sulphate of copper is also placed in the jar, to maintain the strength of the solution. The sulphuric acid in the porous cup unites with the zinc, and the copper sulphate in the jar is decomposed and deposits its copper on the copper cylinder. These chemical changes produce a current of electricity which flows from the copper to the zinc. The Daniell battery in various forms is in general use in telegraph stations and for other purposes where a battery producing a low current is desired.

DANISH WEST INDIES, the name formerly applied to the Virgin Islands of the United States (which see).

DANTE ALIGHIERI, *dahn'ta ah'le gya're*, (1265–1321), Italy's most famous poet, and one of the greatest who ever lived. He was born in Florence of a family which probably belonged to the lower nobility.

Of his youth and education nothing definite is known, although it may be that he studied with the learned Brunetto Latini. He was but a boy of nine years when he first saw Beatrice Portinari, and the love she awakened in him he has described in that record of his early years, the *New Life,* as well as in his later great work, the *Divine Comedy.* In 1291, the year after the death of Beatrice, Dante married Gemma Donati, by whom he had several children. Soon after this time the Guelphs in Florence became divided into the rival factions of Bianchi and Neri (Whites and Blacks), the latter an extreme Papal party, the former a moderate party which wished for reconciliation with the Ghibellines. Dante's sympathies were with the Bianchi, and when, in 1302, the opposite party gained control, Dante was banished with many of his fellows. The poet remained an exile to the end of his life; and his history during this time is semi-mythical. He is said to have visited many cities, Arezzo, Bologna, Sienna and even Paris, and in 1320 he certainly stayed at Ravenna, with his friend Guido da Polenta. He was buried at Ravenna, where his bones still lie.

DANTE ALIGHIERI

Dante's great poem, the *Divine Comedy,* written in great part, if not altogether, during his exile, is divided into three parts, entitled *Hell, Purgatory* and *Paradise.* The title *Comedy* was given to it, in accordance with the standards of the time, because it begins with horrible scenes and ends cheerfully. The epithet *Divine* was added by others because of its lofty character.

The "Divine Comedy." The poet dreams that he has wandered into a dusky forest, when the shade of Vergil appears and offers to conduct him through hell and purgatory. Further the pagan poet may not go, but Beatrice herself will lead him through paradise. Dante with marvelous imaginative power gives brief life histories of the famous guilty ones—Pope and Ghibelline, Italian lord and lady—often in his severe style compressing the story into two or three lines, but always picturing guilt and punishment with passionate force, subtle insight and intense religious faith. From hell, the poet, still in the company of Vergil, ascends to purgatory, where the scenes are

similar, though the punishments are only temporary. In the earthly paradise above purgatory, Dante beholds Beatrice in a scene of surpassing magnificence, ascends with her into the celestial paradise, and after roaming over seven spheres he reaches the eighth, where he beholds "the glorious company, which surrounds the triumphant Redeemer." In the ninth Dante feels himself in the presence of the Divine essence, and sees the souls of the blessed on thrones in a circle of infinite magnitude. The Deity himself, in the tenth, he cannot see for excess of light. Dante's great poem ranks with the world's greatest epics, and has been translated into many languages.

DANTON, *dahN tohN'*, Georges Jacques (1759–1794), one of the leaders in the French Revolution. He was foremost in organizing and conducting the attack on the Tuileries, August 10, 1792, voted for the capital punishment of all returning aristocrats and for the death of the king, and with Robespierre brought Hébert and his followers to the scaffold. Robespierre succeeded in having Danton denounced and thrown into prison because he had dared to counsel moderation, and he was afterward condemned by the revolutionary tribunal as an accomplice in a conspiracy for the restoration of monarchy, and was executed.

DANT'ZIC. See Danzig.

DAN'UBE, the chief commercial river in Europe, second only to the Volga in length and extent of drainage basin. It originates in two small streams, rising in the Black Forest, in Baden, and uniting at Donaueschingen. The direct distance from source to mouth of the Danube is about 1,000 miles, and its total length, including windings, about 1,750 miles. From its source the Danube flows in a northeasterly direction to Ulm, in Württemberg, where it becomes navigable for vessels of 100 tons; then to Ratisbon, in Bavaria, where it becomes navigable for steamers. Here it turns in a southeasterly direction, entering Austria at Passau. It passes Vienna and Budapest, above which it suddenly turns due south, holding this direction till it is joined by the Drave, after which it runs southeasterly and enters Serbia at Belgrade. Continuing its general course eastward, it forms for a long distance the boundary line between Rumania and Bulgaria. At Silistria it once more turns northward, and flowing between Rumania and Bessarabia, it falls into the Black Sea by three different outlets.

The Danube is noted for beautiful scenery along its banks, which in places rivals that of the Rhine. Its value as a commercial route has been enhanced by extensive construction work. The celebrated Iron Gate (which see), through which the river flows across the South Carpathians, has been rendered navigable, and shipping passing through it is regulated by an international commission. There is canal communication with the Rhine, and the Sulina channel mouth has been deepened to accommodate the largest ocean craft.

DANVILLE, Ill., founded in 1827, is the county seat of Vermilion County, and the center of a rich coal-mining district. It is 123 miles south of Chicago, on the Vermilion River, and on the Wabash, the Chicago & Eastern Illinois and the Chicago Southern railroads. Its industries center largely around the coal fields, but the city possesses probably the largest brick plant in the world, and there are important zinc and glass works. A Federal building was erected in 1910 at a cost of $300,000; the county building is scarcely less imposing; there is a $150,000 Y. M. C. A. building, an Elks' Home, a Carnegie Library and two hospitals. Population, 1910, 27,871; in 1917, 32,969 (Federal estimate).

DANVILLE, Va., a city of Pittsylvania County, 140 miles southwest of Richmond, on the Dan River and on the Southern Railroad. The city has a beautiful location, is in a region producing a very fine quality of tobacco, is the second largest leaf tobacco market in America and contains about forty tobacco factories. The river furnishes good water power, and there are large cotton works, flour and grist mills, knitting mills, overall factories, a cheroot factory and other enterprises. It is the seat of Roanoke Institute, Randolph-Macon Institute and Danville School for Boys. The place was settled in 1792. It was for a short time the seat of the government of the Southern Confederacy in 1865. Population, 1910, 12,020; in 1917, 20,183 (Federal estimate).

DANZIG, or **DANTZIC**, *dahn'tsiK*, a free city, internationalized in 1919, by order of the peace conference. It was formerly the capital of the province of West Prussia, 255 miles northeast of Berlin, on the Vistula, about three miles from the Baltic Sea.

Among the principal buildings are the Dom or Cathedral, begun in 1343; the Church of Saint Catharine; the fine old Rathaus; the exchange; the arsenal; an observatory; three monasteries; two synagogues and two theaters. The prosperity of the town is founded chiefly on its transit trade. The principal trade is in grain, timber and sugar. There were formerly German government establishments for the manufacture of arms and ammunition. Danzig is mentioned in historical accounts as early as the tenth century. After being alternately possessed by the Teutonic knights and the Poles, the town fell to Prussia in 1795. That part of old Prussia in which the city is located is inhabited largely by Poles, and in 1919 the peace conference which closed the World War separated Danzig from German control and made the city Poland's outlet to the sea. Population, 1910, 170,347.

DAPHNE, *daf'ne*, in classic mythology, daughter of the river god Peneus. Apollo wooed her in vain, and one day, while he was pursuing her through the woods, she called on her father to change her form, as she found herself exhausted. Peneus then changed her into a laurel tree, which was thereafter sacred to Apollo (see LAUREL). There is a famous statue representing this myth in the Villa Borghese, Rome, the work or Bernini.

DARDANELLES, *dahr da nelz'*, the ancient HELLESPONT, is a narrow channel which connects the Sea of Marmora with the Aegean Sea and is a short part of the boundary separating Europe from Asia. It is about forty-seven miles in length and varies in breadth from one to four miles. A rapid current, often much increased by winds, runs southward. On the Asiatic side the country presents beautiful scenery, rising gradually upward from the sea to the range of Mount Ida; the European side is steep and rugged, but is densely peopled and highly cultivated. On both shores are numerous forts and powerful batteries. Two castles on the opposite shores are near the sites of ancient Sestos and Abydos, and recall the story of Hero and Leander (see HERO).

By a treaty made in 1841 between the five great powers and Turkey, confirmed by the Peace of Paris in 1856, it was decreed that no foreign man-of-war should pass the strait without the express permission of the Turkish government. During the World War the allies made desperate attempts to force a passage through the Dardanelles to Constantinople. In February and March, 1915, an allied fleet bombarded the forts at the entrance, and in April an army was landed on the Gallipoli Peninsula, but with heavy losses. The heroism of the soldiers and the sacrifice of thousands of lives were not enough to overcome the Turks, and after eight terrible months the allied forces withdrew from the peninsula. On the surrender of Turkey, in the fall of 1918, the allies demanded, as one of the armistice terms, permission to occupy the strait, and in November an allied fleet sailed through the Dardanelles to the harbor of Constantinople. See WORLD WAR; CONSTANTINOPLE.

THE REGION OF THE DARDANELLES

DARIEN, *da ri en'*, GULF OF, a gulf of the Caribbean Sea, at the north extremity of South America, between the Isthmus of Panama and the mainland. The chief river flowing into it is the Atrato. Columbus reached the gulf on his fourth voyage in 1502. The Isthmus of Panama was formerly called Isthmus of Darien.

DARIEN SCHEME, a celebrated financial project set afloat by a Scotchman, William Patterson, whose purpose was to form a settlement on each side of the Isthmus of Darien (now Isthmus of Panama), in order to control the trade between the eastern and western hemispheres. Nearly $4,000,000 was subscribed, fully half of it in Scotland, and in 1698 1,200 Scotch colonists sailed for the isthmus. Disease and famine, however, caused them to desert their settlement and return to Scotland in June, 1699. Two other companies of about the same size also attempted to establish settlements at Darien, with equally unfortunate results.

DARIUS I (550–485 B. C.), a Persian king who attained the throne in 521 B. C. One of his first acts was to divide his empire into twenty satrapies, or provinces, with a governor over each. He reduced the revolted city of Babylon, and led an expedition of 700,000 men against the Scythians on the Danube. The Greeks had aided the Ionians in their struggle to free themselves from Persia, and Darius therefore sent an army under Mardonius to invade Greece. But the ships of Mardonius were destroyed by a storm in doubling Mount Athos, and his army was cut to pieces by the Thracians. Darius, however, fitted out a second expedition, which was met on the plains of Marathon by an Athenian army under Miltiades and completely defeated (490 B. C.). Darius had determined on a third expedition, when he died in 485. See MARATHON.

DARIUS III, the twelfth and last king of Persia. He ascended the throne in 336 B. C., when the kingdom had been weakened by luxury and the tyranny of his governors and could not resist the attacks of Alexander of Macedon; the army of Darius was totally routed on the banks of the Granicus, in Asia Minor. Darius then hastened to meet Alexander in the mountainous region of Cilicia and was a second time totally defeated near the Issus. Two years afterward, all proposals for peace having been rejected by Alexander, Darius collected another army, met the Macedonian forces between Arbela and Gaugamela, and was again routed. Alexander captured Susa, the capital, and Persepolis, and reduced all Persia. Meanwhile, Darius was collecting another army at Ecbatana in Media, when a traitorous conspiracy was formed against him, by which he lost his life, in 330 B. C.

DARK AGES, a term used to designate the period from about the fall of the Roman Empire, in 476, to the revival of learning, in the twelfth century. Sometimes the words are understood to mean the entire Middle Ages, but usually only the earlier part of that period is so designated. See MIDDLE AGES.

DAR'LING, GRACE HORSLEY (1815–1842), a celebrated English heroine. In 1838 the steamer *Forfarshire*, with forty-one passengers on board, besides her crew, became disabled off the Farne Islands during a storm and was thrown on a rock, where it broke in two, part of the crew and passengers being left clinging to the wreck. The next morning William Darling observed them from Longstone lighthouse, about a mile distant, but he shrank from attempting to reach the wreck in an open boat in such a raging sea. His daughter Grace, however, implored him to make the attempt and let her accompany him. At last he consented, and father and daughter reached the wreck and succeeded in rescuing nine sufferers. The news of the heroic deed soon spread, and the brave girl received testimonials from all quarters. A purse of $3,500 was publicly subscribed and presented to her. Four years later she died of consumption, honored throughout the world.

DARMSTADT, *dahrm'staht*, GERMANY, capital of the former grand duchy of Hesse, is situated fifteen miles south of Frankfort-on-the-Main. Among the remarkable buildings are the old grand-ducal palace, containing one of the largest libraries in Germany, the Catholic church, and the Rathaus, or townhall, built in 1580. Darmstadt is a busy manufacturing town. There are iron foundries, breweries, machine shops, tobacco factories, carpet works, and manufactories of scientific instruments, chemicals and playing cards. The town is also an important railway center. In 1330 it secured municipal rights, and in 1567 it became the capital of Hesse. It was burned by the French in the seventeenth century, but afterwards rapidly rose in importance. Population, 1910, 87,085.

DAR'NEL, the popular name of a species of poisonous grass. It appears to be the tares of Scripture. It is said to have narcotic and stupefying effects, but recent researches have cast some doubt on its reported injurious qualities. It is met with in corn

fields, and is now naturalized in North America.

DARNING NEEDLE. See DRAGON FLY.

DARNLEY, HENRY STUART, Lord (1545–1567), the second husband of Mary Queen of Scots. He was a son of the Earl of Lennox and Lady Margaret Douglas, a niece of Henry VIII. In 1565 he was married to Mary Queen of Scots. It was an unfortunate match; Mary was disgusted at his coarseness and could not long conceal her contempt. His part in the murder of Rizzio angered Mary still further, and when, on February 9, 1567, the house in which he lay recovering from an illness was blown up by gunpowder, Mary was suspected of complicity in the crime. See MARY STUART.

DARTER, or **SNAKE BIRD,** the latter name applied because of the length of the neck, is a web-footed bird related to the cormorant and found near the eastern coasts of tropical America and the western coast of tropical Africa, as well as in Australia. It is the habit of these birds to perch on

DARTER

trees by the water side and, after hovering an instant over the water, suddenly to dart at their prey with unerring aim. Their nests are rudely constructed in trees, and the eggs are bluish in color.

DARTMOUTH, *dahrt'muth,* NOVA SCOTIA, in Halifax County, on Halifax Harbor opposite Halifax, and on the Intercolonial Railway. The industries include cordage works, a sugar refinery, a cornmeal mill, chocolate and molasses factories, ship repairing and boiler works. The town has six churches and several banks. There is a little gold mining and some agriculture in the vicinity. Population, 1916, 8,000.

DARTMOUTH COLLEGE, one of the earliest and best known of American colleges, situated at Hanover, N. H. The college is the outgrowth of an Indian school which was opened in 1754 and was founded by Rev. Eleazar Wheelock. The institution was named from the Earl of Dartmouth, who was one of the principal contributors and the first president of the board of trustees. The college began its existence in the midst of the wilderness, and the only buildings for several years were log huts, but it continued to increase in numbers and influence until it became one of the leading colleges of the country. Later, a religious controversy caused the state legislature to create a new corporation, which, without consent of the old board of trustees, assumed control of the college. This led to what is known as the Dartmouth College Case (see below). The college still remains an institution for men only. It confers degrees in letters, science, arts, medicine and civil engineering. In the fall of 1917 there were 1,016 students and 139 faculty members; these figures showed a falling off of students and teachers because of the war. The library contains 140,000 volumes.

Dartmouth College Case. Dartmouth College was founded by a charter granted by George III in 1769. When the independence of the United States was established, the state of New Hampshire assumed the position occupied by the throne under the colonial government. In 1816 the legislature created a new corporation for the college, making certain changes in its management. The college appealed to the courts, but lost its suit, and then appealed to the United States Supreme Court where its case was argued by Daniel Webster. The Supreme Court, in a decision handed down by Chief Justice Marshall in 1819, declared that the legislature did not have authority to legislate the old charter out of existence, or to pass laws violating its provisions, by reason of the clause in the United States Constitution which establishes the inviolability of contracts.

DARWIN, CHARLES ROBERT (1809–1882), one of the world's greatest naturalists, the leading scientist of the nineteenth century, was born in Shrewsbury, England. He early devoted himself to the study of natural history, and in 1831 was appointed naturalist to the surveying voyage of H. M. S. *Beagle.* Darwin came home with rich stores of knowledge, part of which he soon gave to the public in various works. In 1859 his name

attained its great celebrity by the publication of *The Origin of Species by Means of Natural Selection.* This work, scouted and derided though it was at first in certain quarters, may be said to have worked nothing less than a revolution in biological science. In it for the first time was given a full exposition of the theory of evolution as applied to plants and animals, the origin of species being explained on the hypothesis of natural selection. This theory is now generally accepted by the prominent scientists, though modified and improved in many of its details. The rest of his works are largely based on the material he had accumulated for the elaboration of this great theory. The principal ones are a treatise on the *Fertilization of Orchids; Domesticated Animals and Cultivated Plants; Descent of Man and Variation in Relation to Sex; The Expression of the Emotions in Man and Animals; Movements and Habits of Climbing Plants; Insectivorous Plants; Cross and Self Fertilization; The Power of Movement in Plants,* and *The Formation of Vegetable Mold.* See EVOLUTION.

CHARLES DARWIN

DAS'KAM, JOSEPHINE DODGE. See BACON, JOSEPHINE DASKAM.

DATE, the fruit of the date palm, or the tree itself. The fruit is used extensively as an article of food by the natives of Northern Africa and of some countries of Asia. It consists of a fleshy coat, separable into three portions, and covering a hard, horny seed. Next to the cocoanut palm, the date is unquestionably the most interesting and useful of the palms. Its stem shoots up to the height of fifty or sixty feet, without branch or division, and is of nearly the same thickness throughout its length. From the summit it throws out a magnificent crown of large, feather-shaped leaves, besides a number of stalks, each of which in the female plant bears a bunch of from 180 to 200 dates, each bunch weighing from twenty to twenty-five pounds. The fruit is eaten fresh or dried. Cakes of dates pounded and kneaded together are the food of the Arabs who traverse the deserts. A liquor resembling wine is made from dates by fermentation. Dates are now being cultivated in California, Arizona and other warm-weather states with considerable success; a large industry is developing.

DATE PALM

DAUDET, *do da',* ALPHONSE (1840–1897), a French novelist, born at Nîmes He went to Paris in 1857 to seek his fortune but his collections of poems failed to win any attention, and his plays met with little better reception. When he discovered his powers as a story-teller, however, his success was assured. The volumes of short stories, *Letters from My Mill* and *Monday Tales,* established his reputation, which was rendered more secure by each novel which he published. *Numa Roumestan* and *The Nabob* are probably his greatest works, although many readers find *Tartarin of Tarascon* the most attractive. Daudet himself regarded *Sapho* as the best of his writings, and it has become widely known through dramatization.

DAUGHTERS OF THE AMERICAN REVOLUTION, a patriotic national society, organized in Washington, D. C., in 1890. Only those women whose ancestors fought upon the American side in the Revolutionary War are admitted to membership. Its purpose is the fostering of reverence for the achievements of the Revolutionary heroes and the collection of relics and the erection of monuments. There are chapters in almost all the states and in Canada, Hawaii and Alaska. Its membership of 105,000 is divided among 1,300 local chapters. The society owns a beautiful memorial hall in Washington, completed in 1910.

DAUGHTERS OF THE CONFEDERACY, UNITED. See CONFEDERACY, UNITED DAUGHTERS OF THE.

DAUPHIN, *daw'fin*, the title given to the eldest sons of the former kings of France. The name was assumed toward the middle of the ninth century by the lord of Dauphiny, which province was bequeathed by Humbert II to the King of France in 1349, on condition that the heir of the throne should bear the title of Dauphin of Vienne and should govern the province.

DAVENPORT, FANNY LILY GIPSY (1850–1898), an American actress, born in London, but educated in Boston. She was only seven years old when she first appeared on the stage and was but twelve when she made her formal début in *Faint Heart Never Won Fair Lady*. After playing for a short time in Mrs. Drew's theater in Philadelphia, she became connected with Augustin Daly's company in New York. Among her most famous portrayals were the leading rôles in *Fedora*, *Cleopatra* and *La Tosca*.

DAVENPORT, IOWA, the county seat of Scott County, on the Mississippi River, 330 miles above Saint Louis, 183 miles west of Chicago, and opposite Rock Island, Ill. It is on the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & Saint Paul, the Chicago, Burlington & Quincy and other railroads of local importance.

The city is built upon the sides of a bluff and has a beautiful location overlooking a wide extent of country. It is connected with Rock Island by a railroad bridge and a combined wagon and railroad bridge. The important buildings include four hospitals, a Carnegie Library, a commercial club building, the fine Blackhawk Hotel and a number of fine office buildings. Among the educational institutions are the Academy of the Immaculate Conception, Saint Ambrose College, Saint Katherine's Hall and Palmer's Chiropractic College. The leading church edifices are the Protestant Episcopal and Roman Catholic cathedrals, Saint John's Methodist Church and the Kirkwood Presbyterian Church. The Iowa Soldiers' Orphans' Home is also located here. The city has a large trade in farm produce and is the seat of a number of extensive industries, including meat packing, manufactories of flour, lumber, wagons, carriages, farming implements and machinery, locomotives, pumps, steel cars and soap. Davenport was founded in 1833, and was named for Colonel George Davenport, leader of the company forming the first settlement. It was incorporated as a town in 1838 and as a city in 1851. Population, 1910, 43,028; in 1917, 49,618 (Federal estimate).

DA'VID, king of Israel, the youngest son of Jesse, a citizen of Bethlehem, and descended through Boaz from the ancient princes of Judah (*I* and *II Sam.*; *I Chron.*). He reigned from 1055 B. C. to 1015 B. C., according to the usual chronology, but recent investigations put the dates from thirty to fifty years later. Under David the empire of the Israelites rose to the height of its power, and his reign has always been looked on by the Jews as the golden age of their nation's history. Much of David's history is told in detail in the subhead *Bible Stories*, under the heading BIBLE.

DAVIES, LOUIS HENRY, Sir (1845–), a Canadian statesman and jurist, born at Charlottetown, Prince Edward Island. He was educated at the Prince of Wales College in that city and in London, England. Davies began the practice of law in his native city in 1866 and became one of the leaders of his profession. In 1869 and 1871–72 he was solicitor-general of the province; 1873–76, leader of the opposition; 1876–79 premier and attorney-general. He was elected to the Dominion House of Commons as a Liberal in 1882 and continuously returned until 1901, when he was appointed judge of the Supreme Court of Canada. He was counsel for Great Britain before the International Fisheries Arbitration Commission at Halifax in 1877, joint delegate with Sir Wilfrid Laurier to Washington for the settlement of the Bering Sea controversy in 1897, and a member of the Joint High Commission for the settlement of

all disputes between Canada and the United States. From 1896 to 1901 he was Minister of Marine and Fisheries.

DAVIS, DAVID (1815–1886), one of America's greatest jurists of the Civil War period, was born in Cecil County, Md. He was graduated from Kenyon College, Ohio, studied law in Massachusetts and Connecticut, and removed to Illinois in 1835. In 1844 he was a member of the state legislature, and in 1848 was made United States circuit judge. In October, 1862, President Lincoln appointed him Associate Justice of the Supreme Court. Judge Davis was nominated by the labor reformers for President in 1872, but he usually affiliated with the Democratic party. In March, 1877, he resigned to enter the United States Senate, where he remained until 1883.

DAVIS, JEFFERSON (1808–1889), an American statesman, president of the Confederate States of America, whose memory is cherished in the South with unceasing devotion. Like Lee, he typified in a very definite way the ideals which inspired those who fought for the Confederacy. Jefferson Davis was born on June 3, 1808, in Christian (later Todd) County, Kentucky. At an early age he went with his parents to Mississippi, where he received his preliminary education. He later entered West Point Military Academy, graduating in 1828, and for seven years he saw important service on the frontier. After engaging for several years in cotton planting, he was elected to Congress in 1845, where he became an ardent follower of Calhoun.

At the commencement of the Mexican War Davis left Congress and entered the contest as colonel of a regiment, and performed distinguished service. He entered the Senate in 1847, and became the leader of the Southern Party in the slavery and States' rights controversy, frequently coming into opposition with Stephen A. Douglas. Davis was Secretry of War during Pierce's administration, and while holding this position introduced several marked improvements in military tactics, coast defense, armament and transportation. Upon the secession of Mississippi, he retired from the Senate, delivering a notable farewell address, and in the same year was elected president of the Confederate States.

During the war he acted with good judgment, dignity and devotion to principle and was especially anxious to mitigate the suffering and sorrow caused by the war. He was taken prisoner soon after the fall of Richmond and was confined in Fortress Monroe for two years. Released on bail in 1867, through the efforts of Horace Greeley and other Northerners, he was given full liberty by the general amnesty of 1868. During his last years Davis resided in Memphis and Mississippi, dying in New Orleans. In 1881 he published *The Rise and Fall of the Confederate Government,* giving his view of the controversy. His remains were removed from New Orleans and interred at Richmond in 1893, where a monument has been erected in his honor.

JEFFERSON DAVIS

DAVIS, REBECCA HARDING (1831–1910), an American novelist, the first writer to bring the labor question into American fiction. Mrs. Davis was born in Washington, Pa. She first became known for the gloomy power of a story, *Life in the Iron Mills,* published (1861) in the *Atlantic Monthly.* After her marriage to L. Clarke Davis, editor of the Philadelphia *Inquirer,* much of her brilliant talent went into journalistic work which has not been preserved. Among her novels are *Dallas Galbraith, Kent Hampden* and *A Law unto Herself.*

DAVIS, RICHARD HARDING (1864–1916), a very popular American novelist, short-story writer and journalist, the son of Rebecca Harding Davis, was born at Philadelphia. He was educated at Lehigh and Johns Hopkins universities, and began literary work as a newspaper reporter in Philadelphia. After serving for a time on the staff of the New York *Evening Sun,* he became managing editor of *Harper's Weekly.* This position he held but a short time. *Gallegher and Other Stories,* published in 1891,

first gained him wide attention, and from that time he held his audience by the interest of his narratives and the vigor of his style.

He gained high rank as a war correspondent, first in Mexico in 1914 and at once transferred to the battle fronts of Europe, from which post his reports to America were classics. Among his other books are *Van Bibber and Others, Cuba in War Time, The Cuban and Porto Rican Campaign, With Both Armies in South Africa,* and the novels *The Princess Aline, The King's Jackal, Soldiers of Fortune, Ransom's Folly, The Man Who Could Not Lose, The Bar Sinister, The Lost Road, Real Soldiers of Fortune,* and others.

DAVIS STRAIT, a narrow sea which separates Greenland from Baffin Land, and unites Baffin Bay with the Atlantic Ocean. It is from 180 to 500 miles wide and was discovered in 1585 by John Davis, after whom it was named.

DA'VITT, MICHAEL (1846–1906), an Irish political leader. In 1870 he was sentenced to fifteen years' imprisonment for bringing arms into Ireland, but he was released in 1878. The next year he founded the Irish Land League, which soon spread over the entire country. He made a tour of the United States on behalf of that organization in 1880; and on his return to England he was again arrested on his old sentence and was held in prison for fifteen months. While in prison he was repeatedly elected to Parliament, but was disqualified. He was later elected twice without opposition, but resigned in 1899.

DA'VY, HUMPHRY, Sir (1778–1829), a distinguished English chemist. He was appointed professor of chemistry in the Royal Institution at the age of twenty-four. In 1803 he was chosen a member of the Royal Society. His discoveries with the galvanic battery, his decomposition of the earths and alkalies and the ascertaining of their metallic bases gave him a worldwide reputation. From his investigation of firedamp in mines, he was led to the invention of a safety lamp, which has rendered the mines comparatively free from explosions and thus prevented the death of thousands of workmen.

DAWSON, GEORGE MERCER (1849–1901), a Canadian geologist and explorer, born in Truro, N. S., educated at McGill University and the Royal School of Mines, London, Eng. He became a member of the staff of the Geological Survey in 1875, and was its director in 1895. He explored a large portion of the western country and made the mineral resources of the region known to the Canadian government. He was a member of the Bering Sea Commission of 1891.

DAWSON, JOHN WILLIAM, Sir, (1820–1899), a Canadian geologist and educator. He received his education at Edinburgh University and at an early age turned his attention to geology. In 1842 he accompanied Sir Charles Lyell on an expedition to examine the geology of Nova Scotia. In 1850 Dawson became superintendent of education for Nova Scotia, and five years later he was made principal and professor of geology in McGill University, Montreal, and later vice-chancellor. He was elected president of the American Association for the Advancement of Science in 1882, and four years later became president of the British Association for the Advancement of Science. Among his many contributions to the literature on science are *Acadian Geology; The Story of the Earth and Man; The Origin of the World; Egypt and Syria; Modern Ideas of Evolution,* and *The Change of Life in Geological Time.*

DAWSON, YUKON DISTRICT, named for Sir John William Dawson (which see), is a city in Canada, the capital of the district, on the right bank of the Yukon River, 330 miles northwest of Skagway, on the line of the Pacific & Arctic Railway & Navigation Company, and there is a twelve-mile line of railroad to Bonanza. The river is open to navigation from June 1 to October 15. There are several churches, schools, hotels and theaters, and the town is lighted by electricity. Dawson is the center of the Klondike gold mining region; its origin dates from the discovery of gold on Bonanza Creek in 1896, and it is now assured of a prosperous future, for the town has become stabilized. Coal deposits have been found in the neighboring region. There is brewing and garden truck farming, and the city has a quartz mill. Population, 1911, 4,000. In 1901, during the early "boom" days, there were over 9,000 people in Dawson.

DAY, the time occupied by the revolution of the earth on its axis, embracing the period of darkness as well as the interval of daylight. The day in the latter sense may be measured in more than one way. If we measure it by the apparent movement of the stars, caused by the rotation of the earth on

its axis, we must call day the period between the time when a star is on the meridian and when it again returns to the meridian; this is a *sidereal* day. It is uniformly equal to 23 hours, 56 minutes, 4.098 seconds. But more important than this is the *solar* day, or the interval between two passages of the sun across the meridian of any place. The latter is about four minutes longer than the sidereal day, owing to the revolution of the earth round the sun, and it is not of uniform length, owing to the varying speed at which the earth moves in its orbit and to the obliquity of the ecliptic. For convenience, an average length of the solar day is taken, and this gives us the *mean solar* or *civil* day of twenty-four hours, the difference between which and the actual solar ray at any time is the *equation of time.*

The length of the days and nights at any place varies with the latitude and season of the year, owing to the inclination of the earth's axis. In the first place, the days and nights are equal all over the world on the 21st of March and the 21st of September, which dates are called the *vernal* (spring) and *autumnal equinoxes.* Again, the days and nights are always of equal length at the equator, which, for this reason, is sometimes called the *equinoctial* line. With these exceptions, we find the difference between the duration of the day and the night varying more and more as we recede from the equator.

The word *day* is also applied in popular speech to the period of time when the sun is above the horizon. In this sense it is used in distinction to night.

The Babylonians began the day at sunrising; the Jews at sunsetting; the Egyptians and Romans at midnight, as do most modern peoples. The civil day in most countries is divided into two portions of twelve hours each. The abbreviations P. M. (post meridiem), afternoon, and A. M. (ante meridiem), forenoon, indicate these divisions. The Italians in some places reckon the day from sunset to sunset and enumerate the hours up to twenty-four; the Chinese divide it into twelve parts of two hours each. For astronomical purposes the day is divided into twenty-four hours, instead of two parts of twelve hours. Formerly the English day began at noon, but since January 1, 1885, the day of twenty-four hours begins at midnight at Greenwich observatory; and this reckoning is now generally adopted for astronomical purposes throughout the world.

DAY, WILLIAM RUFUS (1849–), an American jurist and statesman, born at Ravenna, Ohio. He was graduated at the University of Michigan in 1870 and was admitted to the bar two years later. He practiced law at Canton, Ohio, until 1886 and was appointed to several important positions on the bench. Judge Day became first assistant Secretary of State in April, 1897, and was made Secretary of State upon the resignation of John Sherman in 1898. This position he resigned to act as chairman of the Spanish-American Peace Commission. He was appointed United States circuit judge by President McKinley in 1899 and was made Associate Justice of the Supreme Court in 1903 by President Roosevelt.

DAYLIGHT SAVING, a popular plan for conserving fuel, which not only accomplishes its intended purpose but gives workers in summer additional daylight hours for recreation. Under the law, as operative for years in Europe and in the United States for 1918, clocks and watches are set ahead one hour at midnight on the last Sunday in March and set back an hour on the last Sunday in October. Clock time is observed, the change is ignored, and not the slightest difficulty results. Rural opposition to a daylight saving law in the United States brought its repeal after one year's trial.

DAY LIL'Y, the popular name for a genus of lilies, natives of temperate Asia and Eastern Europe, two species of which are grown in gardens. They have long leaves, growing from the ground, and a branched stem with large, fragrant, white blossoms, the segments of which are united into a tube. The name has reference to the fact that the blossoms live only from sunrise to sunset.

DAY'TON, OHIO, one of America's most progressive cities, is the county seat of Montgomery County, on the Great Miami River, sixty miles northeast of Cincinnati, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie, the Pennsylvania and the Dayton & Union railroads. The city has a beautiful location in the fertile Miami Valley. From the main business portion, the land rises to heights of from 100 to 400 feet, and on these elevations are some of the fine residence sections. Van Cleave Park, along the river, where the first settlers landed, contains the first house built in Dayton, which

now serves as an historical museum. There is a fine soldiers' monument on Main Street near the river bridge. Spanning the rivers are twelve bridges, three of which are beautiful, wide, arched structures of concrete. On an elevation adjoining the city at the west is the central branch of the National Soldiers' Home, which occupies beautiful grounds of about 600 acres. The public library stands in Library Park, near the center of the city.

The educational institutions of Dayton include the United Brethren Theological Seminary, Saint Mary's Institute and the Academy of Notre Dame. The Miami Valley and Saint Elizabeth's hospitals, a state asylum for the insane, a county orphan asylum and a widows' home are other institutions. There are many fine churches, and some of the prominent buildings are the old and new courthouses, the Y. M. C. A. building, the Steele and the Stivers high schools, the public library and the state hospital.

There are many large industrial establishments, the city ranking third in industries in the state. Dayton is the home of the greatest cash register concern in the world. It also manufactures railway cars, oil-mill machinery, steam pumps, sewing machines, bicycles, automobiles, engines, flour, sash and blinds and various other articles. In 1796, the first settlement was made on land which was purchased the previous year from the Indians by Colonel Ludlow and Generals Saint Clair Wilkinson and Jonathan Dayton, after whom the place was named. It was incorporated in 1805, and was chartered as a city in 1841.

In March, 1913, the city suffered disastrously from a great overflow of the Miami. Several hundred lives were lost and millions of dollars worth of property were destroyed. For several days Dayton was entirely cut off from the rest of the world because tracks were washed out and wires were down. Many other towns of the Ohio Valley also suffered. In the same year Dayton adopted the commission form of government, which was followed in January, 1914, by the appointment of a city manager (which see). Population, 1910, 116,577; in 1917, 128,939 (Federal estimate).

DE, *day*, a French preposition meaning *of, from* or *away from*, used in connection with proper names to indicate noble origin or possession of territory, as *Duc de Montmorenci, Guy de Maupassant, Conte d'Artois.* When the word following the preposition begins with a vowel the *e* is dropped and *d* with an apostrophe is used, as in *d'Artois.* Several French expressions containing *de* or *d'* are heard frequently in English current speech, as *coup d'etat* and *table d'hote.*

DEACONESS, *de'kon ess*, a member of any one of various religious orders of women among Protestant churches. The order of deaconesses seems to have been established during the days of the Apostles, and the functions of the members were to assist the deacons and other officials of the church, especially in the care of women. In the fifth century the order was abolished and was not revived until the early part of the nineteenth century. The first of the modern orders was established in Prussia in 1836, by the United Evangelical Church.

The first order in the United States was established in Saint Andrew's Parish of the Protestant Episcopal Church, Baltimore, in 1855, and in 1888 the general conference of the Methodist Episcopal Church provided for the establishment of an order of deaconesses. The members of the modern orders are required to prepare themselves by special training in schools devoted to this purpose and are usually inducted into office by the authorities of the Church. Their work is similar to that of the early deaconesses, though somewhat more extended, as the requirements of the Church are broader. In the Roman Catholic and some of the Episcopal churches, the work corresponding to that of the deaconesses is preformed by sisterhoods.

DEAD-LETTER OFFICE, a division of the Post Office Department to which is sent all mail matter that cannot be delivered. This matter includes all letters and packages that have remained in the office to which they were sent for one month without being called for, and which do not contain any address for their return to the sender; letters, papers and packages that are imperfectly addressed, and articles excluded from the mails by the regulations of the postal authorities, such as liquids, live animals and explosives.

Each year from 12,000,000 to 15,000,000 letters and parcels reach the dead-letter office. About half are returned to the senders, and the remainder are destroyed. Practically a million letters contain money—as much some years as $7,500,000. Nearly all this money is returned to the senders; that

which cannot be so disposed of—from $30,000 to $50,000—is put into a fund to help pay the expenses of the office.

DEAD RECK'ONING, the calculation of a ship's place at sea, without any observation of the heavenly bodies. It is obtained by keeping an account of the distance the ship has run by the log and of its course steered by the compass, and by rectifying these data by the usual allowance for drift, leeway and winds. Dead reckoning can never be accurate; so whenever possible it is corrected by astronomical observations.

DEAD SEA, called in Scripture SALT SEA, SEA OF THE PLAINS, and EAST SEA, a celebrated lake in Asiatic Turkey, near the south extremity of Palestine. Its length is about forty-seven miles, and its breadth at the widest part, nine miles. The basin in which the Dead Sea lies forms the south end of the great depression through which the Jordan flows, that river entering the lake at its north extremity. It receives several other tributaries, but has no outlet. The surface is 1,310 feet below the level of the Mediterranean. It lies deeply inbedded between lofty cliffs of naked limestone, its shores presenting a scene of indescribable desolation and solitude, encompassed by desert sands and bleak, stony, salt hills. Sulphur and rock salt, lava and pumice abound along its shores. The water is nauseous to the taste and smell, and it is so buoyant that the human body will not sink in it. The Dead Sea contains no life of any kind. At about a third of its length from the north end it attains a maximum depth of 1,308 feet.

DEADWOOD, S. D., the county seat of Lawrence County, near the western boundary of the state, on the Chicago, Burlington & Quincy and the Chicago & North Western railroads and on an electric line. The city is in the center of a rich gold belt, and cyanide works, smelters and other mining industries are located here. It is also the seat of a United States assay office, where millions of dollars in gold are handled every year. Among the important buildings are a Masonic Temple, a Carnegie Library, the Stilwell Curio Museum and a Federal building. The place was settled in 1876. Population, 1910, 3,653.

DEAF, *def*, **AND DUMB** (or **DEAF-MUTES**), persons who cannot hear or speak. Some mutes are speechless because of defects of the vocal organs, but there are many whose inability to articulate sounds arises from their never having heard those sounds. Human beings learn to speak through imitation of others whom they hear. There are two forms of deafness, *congenital* (existing from birth), and *acquired*.

Among the causes assigned for congenital deafness are the intermarriage of near relatives, hereditary transmission, scrofula, certain local or climatic conditions and arrest of development before birth. Acquired or accidental deafness, which occurs at all ages, is frequently due to such diseases as smallpox, measles, typhus, paralysis and other affections of the brain, but more particularly to scarlet fever, which may leave the patient deaf because the inflamed state of the throat extends to the internal ear, and thus causes the formation of pus and the destruction of the extremely delicate parts of the auditory apparatus.

The necessity of communication and the want of words oblige the deaf-mute to observe and imitate the actions and expressions which accompany various states of mind and of feeling, to indicate objects by their appearance and use, and persons by some peculiar mark, and to describe their actions by direct imitation. In this way he and his friends are led to form a dialect of that universal language of attitude, gesture and expression which becomes a substitute for words in the hands of the pantomimic actor, and which adds force and clearness to the finest effusions of the orator; in other words, the natural sign language, which, in its elements, is to be found among all nations. Such a means of communication is at its best very imperfect, however, and various more perfect systems have been devised to enable deaf-mutes to communicate with one another and with the rest of mankind, and thus to gain such an education as people in general possess.

Education of the Deaf and Dumb. In ancient times and during most of the Middle Ages, the deaf were considered incapable of caring for themselves and could not enter upon a contract. In 1648 John Bulwer published a work in English advocating the education of deaf-mutes. About one hundred years later the first public demonstration of the practicability of such education was made. At about the same time a successful system of instruction was introduced

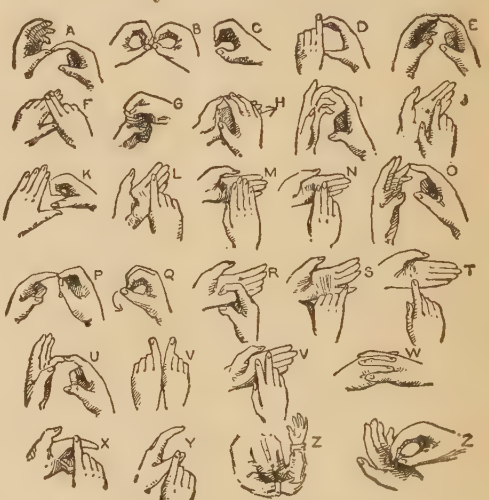
into the Royal Parisian Institute, where it was followed for a long time. The vocal system of instruction was introduced into Germany in 1779, and the first public institute in England was established in 1792.

DEAF AND DUMB ALPHABET
For one hand

From this originated the London Asylum on Kent Road. The first school for the instruction of deaf in the United States was established at Hartford, Conn., in 1817. For a time this school received inmates from the New England states and from South Carolina and Georgia. Massachusetts then established an institute, and other states followed, until now every state has an institution for the education of deaf-mutes, and several states have provisions for establishing classes in connection with the public schools. In the entire country there are over 150 state, private and public day schools for the deaf; Canadian cities maintaining such institutions include Montreal, Quebec, Toronto, Winnipeg and Victoria.

There are two methods of instruction which are generally followed. These are known as the *sign* method and the *oral* method. According to the first, the pupils are taught by the manual alphabet and by signs. According to the oral method the pupils are taught to observe the lips and other vocal organs of the teacher and then to reproduce the sounds. In the teaching of deaf children to speak, the pupils not only are expected to observe the motions of the organs, but are required to place their hands upon the throat of the teacher and feel the vibrations, then to place their hands upon their own throats and reproduce these vibrations. In some schools the Bell system of visible speech (which see) has replaced the method just described. The Bell system consists of a series of alphabetical characters based on the position of the vocal organs when they are moving. In the most up-to-date schools pupils learn lip reading in connection with the study of vocal sounds. By observing the motion of the lips they learn to recognize words and can thus carry on conversations with comparative ease.

Opinion has been divided on the advantages to be derived from each of these methods of instruction. Those who favor the sign method claim that it is much more easily learned, and that the pupils therefore can make more rapid progress; while the opponents of this system claim that the use of the



DEAF AND DUMB ALPHABET
For two hands

sign language is not calculated to develop the intellect, and that pupils trained by this method never receive as broad an education or become as efficient thinkers as those trained by the oral method. The general trend of opinion is decidedly in favor of the oral method, and in the greater number of American schools the sign method is not used. See KELLER, HELEN A.; SIGN LANGUAGE.

There is a growing body of literature on the subject of the education of the deaf, much

of which is especially helpful to parents of afflicted children. Mention should be made particularly of John D. Wright's What the Mother of a Deaf Child Ought to Know, and recent volumes of the Volta Review, published by the Volta Bureau at Washington, D. C.

DEAR'BORN, HENRY (1751–1829), an American soldier who distinguished himself in many battles of the Revolution and in the War of 1812. He was captured by the British at Quebec, but was released and was with Washington at Yorktown. In 1793 he was elected to Congress, and for eight years he was Secretary of War. His last public service was as minister to Portugal. Fort Dearborn, on the site of Chicago, was named for him.

DEATH, the final condition of all animal and vegetable matter, characterized by the stoppage of all growth and motion. Human beings die when the heart stops beating, for this means arrest of the circulation and of the supply of nourishment to the tissues. Throughout life some of the body cells are always dying, and new ones are taking their places. The living body is therefore undergoing a continuous battle with death; we begin to die as soon as we begin to live. The subject of increasing the span of man's life by control of disease is one of the vital questions of the present day. In general, the death rate among civilized nations is gradually being lowered as knowledge of hygiene and sanitary science is increasing.

DEATH'S HEAD MOTH, a large moth, measuring five inches when the wings are extended. It has upon the back of its thorax marks closely resembling a skull, or death's head. Although the subject of many superstitious beliefs, it is probable that it

DEATH'S HEAD MOTH

does no other damage than occasionally attacking bees and consuming their honey.

DEATH VALLEY, a desolate, arid plain bordered by mountains, situated near the eastern boundary of California, in Inyo County. During the rush to the gold fields in 1849, a band of emigrants lost most of their company in this barren region, and the name which they gave the valley has been retained. Death Valley is about 150 miles long and varies in width from ten to thirty miles. It is about 210 feet below sea level, and except for such characteristic desert growths as cacti and greasewood, it is without plant life.

Recently the United States Reclamation Service opened up several mineral springs in the valley, making it a safer place for miners and others who have to visit it. This region is one of the most important sources of borax (which see), and its mountain ranges contain also silver, copper, lead and gold quartz.

DEBATE, *de bayt'*, a formal discussion carried on by two opponents or two teams of opponents, in which each side endeavors to prove the truth of certain statements and to refute the arguments presented by the other side. The subject under discussion is generally stated in the form of a resolution, as, "Resolved, That city life is of greater benefit to the individual than country life." The side upholding this resolution is called the *affirmative;* the side presenting arguments against it is the *negative.* Sometimes the subject is framed as a question, as, "Should labor unions be encouraged?" In this case the affirmative side argues on the side of the labor unions, and the negative argues against them.

The first speaker for the affirmative always begins the debate; he is followed by the first speaker for the negative. The second speaker for the affirmative continues, and so on, alternately, until all have spoken once. Finally, the leader for the negative summarizes the arguments for his side, and the debate closes with a summary by the affirmative leader. Usually the decision as to the winner of the debate is left to three judges. They award the decision to the side which has presented the most points and has best answered the points made by the opposing side.

The ideal subject is one which permits a well-balanced argument. The points for and against should be as nearly equally divided as possible, or else one side will have an undue advantage. The resolution should be stated as clearly and as concretely as possible. Ambiguous phrasing leads to con-

fusion of interpretation and prevents a really fair presentation. The subject should not be too general, and it should have enough points of interest to stimulate research and thought. A discussion as to the comparative merits of Grant and Lee is a good selection, because both generals were commanders in chief in the Civil War, and each was the best officer on his side. A debate on the merits of Napoleon and McClellan, on the other hand, is an example of a one-sided discussion. Again, if the subject of woman's rights be debated, the resolution should state clearly what rights are meant, whether voting, the right to hold office, equality in business life, or other right. Debating is an excellent drill for young people. It trains the mind to think logically, it develops ability to express oneself orally, and it trains the judgment. If worth while subjects are chosen it adds to the debater's store of information and gives him valuable training in research work.

Suggested Topics. Below is given a list of subjects appropriate for discussion by a school or neighborhood debating club:

Resolved,

That the censorship of moving pictures should be abolished.

That the United States should institute universal military service as a permanent feature.

That the settlement of labor disputes by arbitration should be made compulsory.

That all nations should be compelled to disarm after the World War.

That credits in Latin or Greek should not be required for college entrance.

That local option is more effective than state prohibition in dealing with intemperance.

That women should have equal voting rights with men.

That the honor system of examinations should be established in our high school.

That high school fraternities are undesirable.

That children under fourteen should not be permitted to work for wages.

That the Panama Canal should be made an international waterway.

That the Monroe Doctrine as a feature of the foreign policy of the United States should be abandoned.

That the law forbidding illiterate immigrants to enter the United States should be repealed.

That the Presidential term should be increased to six years and the President be ineligible to succeed himself.

That national governments should own and operate all telegraph, telephone and railroad systems.

Outline of a Debate. A subject appropriate for a school debate follows, with arguments for both sides outlined:

Resolved, that capital punishment should be abolished in the United States.

Affirmative

1. Capital punishment is unnecessary, for justice can be meted out to the offenders by means of imprisonment. Society is at the same time protected from their lawlessness.
2. Life imprisonment is a more severe punishment than death, because it makes the offender pay the penalty through a long period of time.
3. Capital punishment has evil effects upon the community, for—

A. It diminishes the sacredness in which human life is held; if the state claims the right to kill its citizens, individuals will feel that they are justified in taking life. Only God has the right to take human life.

B. Capital punishment tends to lower the moral sense of the public, for the details are usually published in all their horror.

C. It often leads to outbursts of sentimentality on the part of the public. Juries will sometimes acquit guilty prisoners rather than give decisions that mean death. Thus the murderer may be freed.

4. Capital punishment is not in accordance with the most enlightened methods of saving the criminal. It should be replaced by reformatory methods.
5. Capital punishment is a relic of a past age when cruelty and revenge were in vogue. This is a humane age, and the best thought of the time is opposed to the death penalty.

Negative

1. Capital punishment is the only sure punishment for grave crimes. An imprisoned murderer always has the hope of being pardoned. There is no sure protection from criminals so long as they are alive.
2. There is no greater punishment to the average person than taking away his right to life.

A. Capital punishment is merely a recognition of the right of the state to protect society from the evil passions of those who defy the law of God and man. A man who takes life is morally bound to pay for his crime with his own life.

B. The fact that newspapers publish nauseating details does not alter the justice of the execution. The papers should be prohibited from featuring such events as executions.

C. Trials for murder should be conducted without publicity. Sentimental outbursts are due to newspaper exploitation.

3. The first duty of the state in dealing with criminals is the protection of society. The fear of death acts as a deterrent on the passions of those who might commit murder, and where capital punishment is in force crimes are decreasing.